Report of Dam Safety Assessment of Coal Combustion Surface Impoundments American Electric Power (AEP) and Southwest Electric Power Company (SWEPCO) H.W. Pirkey Power Plant, Hallsville, TX

AMEC Project No. 3-2106-0183.0003

Prepared By:

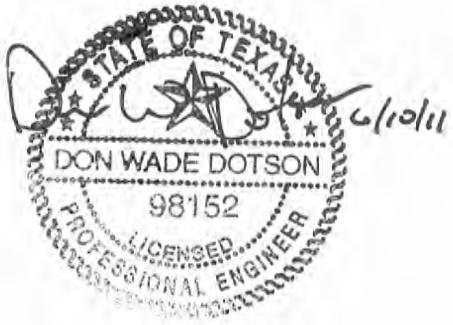
AMEC Earth & Environmental, Inc.
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, KY 40299

Texas Registered Engineering Firm F-0012
Texas Registered Geoscience Firm 50184

Prepared For:

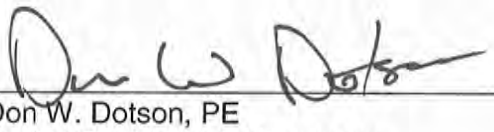
U.S. Environmental Protection Agency
Office of Solid Waste and Emergency Response
Office of Resource Conservation and Recovery
1200 Pennsylvania Ave., NW
MC: 5304P
Washington, DC 20460

June 2011



I certify that the management units referenced herein:

American Electric Power (AEP) and Southwestern Electric Power Company (SWEPCO) H.W. Pirkey Power Plant West Ash Pond, East Ash Pond, Secondary Ash Pond, Surge Pond, Auxiliary Surge Pond, Landfill Runoff Pond, were assessed on October 19, 2010.

Signature 

Don W. Dotson, PE
Senior Geotechnical Engineer

List of AMEC Participants who have participated in the assessment of the management units and in preparation of the report:

- Chris Eger
  CADD Technician
- Daniel Conn
  GIS Specialist
- Mary Sawitzki, PE
  Civil/Environmental Engineer

TABLE OF CONTENTS

SECTION **PAGE NO.**

1.0 INTRODUCTION AND PROJECT DESCRIPTION....3
1.1 Introduction....3
1.2 Project Background....3
1.2.1 State Issued Permits....4
1.3 Site Description and Location....5
1.4 Ash Ponds....5
1.4.1 West Bottom Ash Pond....6
1.4.2 East Bottom Ash Pond....6
1.4.3 Secondary Ash Pond....6
1.4.4 Surge Pond....6
1.4.5 Auxiliary Surge Pond....7
1.4.6 Landfill Runoff Pond....7
1.5 Previously Identified Impoundment Safety Issues....7
1.6 Site Geology....7
1.7 Inventory of Provided Materials....8
2.0 FIELD ASSESSMENT....9
2.1 Visual Observations....9
2.2 Visual Observations - West Ash Pond....9
2.2.1 West Ash Pond - Embankments and Crest....10
2.2.2 West Ash Pond - Outlet Control Structures....10
2.3 Visual Observations - East Ash Pond....10
2.3.1 East Ash Pond - Embankments and Crest....10
2.3.2 East Ash Pond - Outlet Control Structure....10
2.4 Visual Observations - Secondary Ash Pond....10
2.4.1 Secondary Ash Pond - Embankments and Crest....11
2.4.2 Secondary Ash Pond - Outlet Control Structure....11
2.5 Visual Observations - Surge Pond....11
2.5.1 Surge Pond - Embankments and Crest....11
2.5.2 Surge Pond - Outlet Control Structure....11
2.6 Visual Observations - Auxiliary Surge Pond....11
2.6.1 Auxiliary Surge Pond - Embankments and Crest....11
2.6.2 Auxiliary Surge Pond - Outlet Control Structure....11
2.7 Visual Observations - Landfill Runoff Pond....12
2.7.1 Landfill Runoff Pond - Embankments and Crest....12
2.7.2 Landfill Runoff Pond - Outlet Control Structure....12
2.8 Monitoring Instrumentation....12
3.0 DATA EVALUATION....13
3.1 Design Assumptions....13
3.2 Hydrologic and Hydraulic Design....13
3.2.1 Long Term Hydrologic Design Criteria....13
3.2.2 CCW Impoundments Hydrologic Criteria....15
3.2.3 Recent Hydrologic and Hydraulic Criteria....17
3.3 Structural Adequacy & Stability....19
3.3.1 Comparative Stability Factor of Safety Standards....19
3.3.2 October 2010 Embankment Investigation....20
3.4 Foundation Conditions....22

3.5 Operations and Maintenance 22
3.5.1 Instrumentation 23
3.5.2 State or Federal Inspections 25
4.0 COMMENTS AND RECOMMENDATIONS 26
4.1 Acknowledgement of Management Unit Conditions 26
4.2 Hydrologic and Hydraulic Recommendations 27
4.2.1 West Bottom Ash Pond 27
4.2.2 East Bottom Ash Pond 28
4.2.3 Secondary Bottom Ash Pond 28
4.2.4 Surge Pond 28
4.2.5 Auxiliary Surge Pond 28
4.2.6 Landfill Runoff Pond 29
4.3 Geotechnical and Stability Recommendations 29
4.4 Monitoring and Instrumentation Recommendations 30
4.5 Inspection Recommendations 30
5.0 CLOSING 32

TABLES

Table 1. Site Visit Attendees 3
Table 2. Pirkey Rainfall Data 9
Table 3. MSHA* Minimum Long Term Hydrologic Design Criteria 14
Table 4. Summary of Existing and Proposed Landfill Runoff Pond Conditions 18
Table 5. Summary of Pond Hydraulic Characteristics 18
Table 6. Minimum Stability Factors of Safety 19
Table 7. Stability Analysis Boring, Piezometer, and Soils Summary 20
Table 8. Summary of Triaxial and Direct Shear Tests 21
Table 9. Summary of Soil Stability Analyses Factors of Safety 22
Table 10. Monitoring Well Summary 24
Table 11. Piezometers Located at CCW Impoundments 24

FIGURES

Project Location Map ..... Figure 1
Photo Site Plan ..... Figure 2
Critical Infrastructure Map ..... Figure 3
Pirkey Site and Stormwater Flow Map ..... Figure 4
Typical Cross Section-West Ash Pond South Embankment ..... Figure 5
Bottom Ash Pond Discharge Structure and Secondary Ash Pond Plan View ..... Figure 6
Auxiliary Surge Pond Plan and Cross Section ..... Figure 7
Stability Analysis Critical Cross Section Locations ..... Figure 8
Monitoring Well Location Map ..... Figure 9

APPENDICES

EPA Coal Combustion Dam Inspection Checklists and Coal Combustion Waste Impoundment Inspection Forms Data ..... Appendix A
Site Photo Log Map and Site Photos ..... Appendix B
Inventory of Provided Materials ..... Appendix C
Monitoring Well Groundwater Elevation Data (2005 - 2010) ..... Appendix D

1.0 INTRODUCTION AND PROJECT DESCRIPTION

1.1 Introduction

AMEC was contracted by the United States Environmental Protection Agency (EPA) contract BPA EP09W001702, to perform assessments of selected coal combustion byproducts surface impoundments. AMEC was directed by EPA, through the provided scope of work and verbal communications, to utilize the following resources and guidelines to conduct a site assessment and produce a written assessment report for the coal combustion waste facilities and impoundments.

- Coal Combustion Waste (CCW) Impoundment Inspection forms (hazard rating, found in Report Appendix A)
- Coal Combustion Dam Inspection Checklist (found in Report Appendix A)
- Impoundment Design Guidelines of the Mining Safety and Health Administration (MSHA) Coal Mine Impoundment Inspection and Plan Review Handbook (hydrologic, hydraulic, and stability conditions)
- National Dam Safety Review Board Condition Assessment Definitions (condition rating)

As part of this contract with EPA, AMEC was assigned to perform an assessment of American Electric Power and Southwest Electric Power Company's (AEP-SWEPCO) H. W. Pirkey Power Plant (Pirkey). This plant is located in rural Harrison County, Texas, as shown on Figure 1, the Site Location Map.

A site visit to Pirkey was made by AMEC on October 19, 2010. The purpose of the visit was to perform visual observations, to inventory coal combustion waste (CCW) surface impoundments, assess the containment dikes, and to collect relevant historical impoundment documentation.

AMEC engineers, Don Dotson, P.E. and Mary Sawitzki, P.E., were accompanied during the site visit by the following individuals:

Table 1. Site Visit Attendees

Company or Organization	Name and Title
AEP-SWEPCO	Drew Seidel - Pirkey Plant Manager
AEP-SWEPCO	Ron Franklin - Environmental Services
AEP-SWEPCO	Brett Dreger - Geotechnical Engineer
AEP-SWEPCO	Brian Whatley - Environmental Services
AEP-SWEPCO	Kelly Spencer - Plant Environmental Support

1.2 Project Background

Coal fired power plants, like AEP-SWEPCO's Pirkey, produce CCW as a result of the power production process. At Pirkey, impoundments (dams) were designed and constructed to provide storage and disposal for the CCW that is produced. AEP-SWEPCO personnel refer to the six CCW impoundments at the Pirkey facility as West Bottom Ash Pond, East Bottom Ash

Pond, Secondary Bottom Ash Pond, Surge Pond, Auxiliary (North or Upper) Surge Pond, and Scrubber Sludge Landfill Stormwater Runoff Pond (Landfill Runoff Pond). The Pirkey facility was constructed and placed into operation in 1985.

The National Inventory of Dams (NID), administered by the U.S. Army Corps of Engineers (USACE), provides a hazard rating for many dams within the United States. None of the CCW impoundments at the Pirkey plant are listed on the NID.

As part of the observations and evaluations performed at Pirkey, AMEC completed EPA's Coal Combustion Dam Inspection Checklists and CCW Impoundment Inspection Forms. Inspection forms for each pond are presented in Appendix A. The Impoundment Inspection Forms include a section that assigns a "Hazard Potential" that is used to indicate what would occur following failure of an impoundment. "Hazard Potential" choices include "Less than Low," "Low," "Significant," and "High." As defined on the Inspection Form, dams assigned a "Significant Hazard Potential" are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. "Significant Hazard Potential" classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure." "Low Hazard Potential" classification definition is reserved for dams where "failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property." "Less than Low Hazard Potential" classification is reserved for dams where "failure or misoperation results in no probable loss of human life and no economic or environmental losses."

In the Draft[1] Report, AMEC engineers, based on the site visit evaluation of the impoundments, assigned a "Low Hazard" potential to the following ponds: East Ash, Secondary Ash, Surge, Auxiliary Surge, and Landfill Runoff. A "Significant Hazard" potential was assigned to the West Ash Pond. However, following receipt of Draft Report comments from AEP, the hazard potential of the West Ash Pond was changed from "Significant" to "Low". The change was made following clarification of the drainage path contents from the West Ash Pond would follow in the event of failure. Existing topography and drainage patterns would carry any discharge nearly a mile to the southwest, along an unnamed tributary before confluencing with Hatley Creek, instead of directly into the adjacent Brandy Branch Reservoir as previously reported. Environmental impacts would be lower than previously anticipated.

1.2.1 State Issued Permits

The Texas Commission on Environmental Quality has issued Texas Pollutant Discharge Elimination System (TPDES) Permit No. 02496 to AEP-SWEPCO. This TPDES Permit authorizes AEP-SWEPCO to discharge clarified and treated wastewater from the coal combustion processes at Pirkey to unnamed tributaries of Hatley Creek, which flow to Hatley Creek and on to the Sabine River above the Toledo Bend Reservoir. The effective date of the permit is May 14, 2007. The permit expires at midnight on April 1, 2011.

The state of Texas has not issued permits that pertain directly to the structural integrity or operation of CCW impoundments at the Pirkey facility.

[1]AMEC submitted the Draft Report to EPA in November 2010.

1.3 Site Description and Location

AEP-SWEPCO's Pirkey Plant is located in Harrison County, Texas, approximately 7 miles southwest of Marshall, Texas. The area surrounding the plant boundary is rural. Discharges from the plant are directed to an unnamed tributary of Hatley Creek. The distance between the southwestern corner of the West Bottom Ash Pond and Hatley Creek is approximately 1 mile. The Aerial Site Plan, included as Figure 2, provides a view of the six ponds that are the subject of this assessment.

Figure 3, the Critical Infrastructure Map, provides an aerial view of the region and indicates the location of the Pirkey ash ponds and other impoundments in relation to schools, hospitals, and other critical infrastructure that is located within approximately 5 miles down gradient of the impoundments.

1.4 Ash Ponds

Pirkey utilizes coal in the production of electricity. In this process, two types of ash are generated: fly ash and bottom ash. Bottom ash, the heavier and coarser of the two, is sluiced into either the West or East Ash Pond. Decant water from the West and East Ash Ponds is discharged into the Secondary Ash Pond. Decant from the Secondary Ash Pond is pumped back to the plant for reuse or gravity discharged to Hatley Creek via permitted TPDES Outfall 006. Bottom ash excavated from the drained ash ponds is hauled by truck to either the nearby mine operation for beneficial reuse or it is used in the landfill as a drainage medium. A percentage of the fly ash produced is sold as a concrete supplement or is landfilled after being mixed with scrubber sludge. Flue gas desulfurization (FGD) is practiced at Pirkey and sludge produced from this process is sent to the landfill. Excess process water (filtrate) from the FGD process is sent to the Surge Pond. The Auxiliary Surge Pond is used only when additional storage volume is required. The Landfill Runoff Pond receives stormwater runoff and leachate from the on-site landfill facility.

The ash handling summary detailed above was based on review of provided documentation as well as communication with AEP-SWEPCO facility personnel who are knowledgeable concerning the facility's operational processes. A 2009 document, written by AEP-SWEPCO in response to EPA's Request for Information under Section 104(e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C 9604(e), provided the following general background for the ash, surge and landfill runoff ponds.

- The West and East Ash Ponds as well as the Secondary Ash Pond each contain bottom ash and sluice water. Bottom ash content in the Secondary Pond was noted to be minimal.
- The Surge and Auxiliary Surge Ponds, as well as the Landfill Runoff Pond contain flue gas emission control residuals.
- Each of the six subject ponds were designed by a professional engineer.
- Each of the six subject ponds were constructed under the supervision of a professional engineer.
- Each of the six subject ponds is inspected/monitored under the supervision of a professional engineer.
- The Landfill Runoff Pond was commissioned in 1993. All other CCW impoundments were commissioned in 1985.

Provided documentation indicates that a "cohesive lining verification program" was followed during construction of the CCW ponds that related to a certain thickness of compacted liner being installed. Although not confirmed with facility personnel, design documents indicate that a compacted, three feet thick clay liner (CL, CH, or SC) exists in each of the ponds that contain CCW material. Additional information that is specific to each ash pond is presented in the following sections. Current descriptive information resulting from the site visit, as well as photographic references, are provided in Section 2, Field Assessment.

Figure 4, the Site Stormwater Flow Plan, illustrates existing pond embankment locations as well as directional routing for site stormwater at the Pirkey facility.

A summary of pond crest and maximum operating water surface elevations, provided as part of AEP's comments to the Draft Report, is included in Table 4 (Section 3.2.3) of this report.

1.4.1 West Bottom Ash Pond

AEP-SWEPCO's response to the EPA request for information provided the following information.

The West Bottom Ash Pond (West Ash Pond) is located northwest of the main plant buildings and shares its eastern border with the western border of the East Bottom Ash Pond. The West Ash Pond receives sluiced bottom ash and has a surface area of 30.9 acres and a storage capacity of 188 acre-feet. The volume of material stored in the unit in early 2009 was reported to be 150,000 cubic yards (CY). The maximum embankment height is 25 feet. Design materials included in the provided documentation indicate that the main upstream embankment slopes are 3 feet horizontal to 1 foot vertical (3:1 H:V); while the main downstream slopes are 2.5:1 (H:V). Figure 5 illustrates a typical cross section from the pond's south embankment.

1.4.2 East Bottom Ash Pond

The East Ash Pond, which also receives sluiced bottom ash, is located directly adjacent to and east of the West Ash Pond. The surface area of the East Ash Pond is 30.9 acres. The pond contains a storage capacity of 188 acre-feet, with an early 2009 reported stored material volume of 150,000 CY. The pond is almost entirely incised, with a reported maximum embankment height of 4 feet.

1.4.3 Secondary Ash Pond

The Secondary Ash Pond, which is located immediately below the western portion of the East Ash Pond, receives decant from both ponds. This pond is entirely incised and has a reported surface area of 2.7 acres. The volume of materials reported stored in the pond in early 2009 was approximately 200 yards.

Figure 6 illustrates the Secondary Ash Pond and the decant discharge locations in the West and East Ash Ponds.

1.4.4 Surge Pond

The Surge Pond, which is located below the Secondary Ash Pond, receives flue gas emission control residuals from the facility. This pond has a surface area of 4.7 acres, a storage capacity

of 18.8 acre-feet, and is entirely incised. The volume of stored material, as of March 2009, was reported to be approximately 1,500 CY.

1.4.5 Auxiliary Surge Pond

The Auxiliary Surge Pond is located to the north and east of the Surge Pond. This pond is used to provide additional storage volume for flue gas emission control residuals should the Surge Pond volume be deficient during peak flow periods. This pond is primarily diked, but is incised along its northern boundary. The reported maximum embankment height is 15.9 feet, the pond's surface area is 4.3 acres, and it has a total storage volume of 63.7 acre-feet. The stored material volume as of March 2009 was reported to be approximately 1,000 CY. Design materials included in the provided documentation indicate that the main downstream slopes are 3:1 (H:V). While the main upstream embankment slopes are unmarked, they appear to be 3:1 (H:V) as well. This pond and a typical cross section are illustrated in Figure 7.

1.4.6 Landfill Runoff Pond

The Landfill Runoff Pond is located away from the main pond area and southwest of the on-site landfill. An embankment exists along the southern and western portions of the pond. Design materials included in the provided documentation indicate that the main upstream embankment slopes are 4:1 (H:V); while the main downstream slopes are 3:1 (H:V). The reported maximum embankment height is 19 feet, the pond's surface area is 12.9 acres, and it has a total storage volume of 25 acre-feet. The stored material volume as of March 2009 was reported to be approximately 10,000 CY.

1.5 Previously Identified Impoundment Safety Issues

Discussions with plant personnel and review of provided documentation indicate that there are no current or previously identified impoundment safety issues from the previous 5 years at the Pirkey facility.

1.6 Site Geology

In October 2010, ETTL Engineers & Consultants completed an investigation entitled *Pirkey Power Station, Existing Ash, Surge, Lignite and Limestone Runoff, and Landfill Stormwater Ponds Embankment Investigation* (AEPPRK000001). Geologic information was provided in this report for the Pirkey facility. It was noted, in terms of geologic history that;

> *The stratigraphy of Harrison County, as it relates to the occurrence of fresh groundwater, consists of alternating sequences of continental, deltaic, and marine sediments that are predominantly of Eocene age. Continental and deltaic units that are composed predominantly of quartz sand with varying quantities of silt and clay contain the fresh ground water in the area and form the major conduits for its movement. Marine portions of the section, consisting largely of clay or shale with lesser quantities of silt and glauconitic sandstone, form the intervening aquitards.*

A geologic map of the region is presented as Figure 8.

In terms of regional geology, the Reklaw Formation, Carrizo Sand, and the Wilcox Group, were each described as existing at the Pirkey site and influencing the subsurface conditions.

> *The Reklaw is typically composed of thin beds of gray to brown silty clay. The upper portion of the formation commonly contains brownish black to brownish gray silty sand. The lower portion of the formation commonly contains interbeds of silt and very fine to fine-grained, grayish green, glauconitic, quartz sand and may be transitional with the underlying Carrizo Sand.*

The Carrizo Sand outcrops at the Pirkey site "along the tributary of Hatley Creek and near Brandy Branch." Composition of this material is typically "fine- to medium-grained quartz sand with minor occurrences of interbedded gray clay."

The report then notes that, "Characteristic lithologies of the Wilcox Group are gray, silt and sandy clay with localized beds of clay, lignite, silt, and quartz sand." Finally, "calcareous siltstone and ironstone concretions may appear as continuous ledges within the formation."

1.7 Inventory of Provided Materials

AEP-SWEPCO provided AMEC with several documents pertaining to the design and operation of Pirkey. These documents were used in the preparation of this report and are listed in Appendix C, Inventory of Provided Materials.

2.0 FIELD ASSESSMENT

2.1 Visual Observations

AMEC performed visual assessments of Pirkey's Ash Ponds (1, 2, and Secondary), Surge Ponds (1, 2, and Auxiliary), and Fly Ash/FGD Landfill Pond on October 20, 2010. Assessment of the ash ponds was completed in general accordance with *FEMA's Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams, April 2004*. The EPA Coal Combustion Dam Inspection Checklist and Coal Combustion Waste (CCW) Impoundment Inspection Form were completed for each ash pond during the site visit and provided to the EPA via email within five business days following the site visit. Appendix A contains copies of the completed checklist forms. Photo location site maps for each ash pond, as well as descriptive photos, can be found in Appendix B. Rainfall data for the Shreveport, Louisiana area was collected for September and October, 2010 for the days prior to the site visit. Table 2, below, summarizes the rainfall data for the days and month immediately preceding AMEC's site visit.

Table 2. Pirkey Rainfall Data

Rainfall Prior to Site Visit	
Date	**Rainfall (in.)**
October 11, 2010	0.00
October 12, 2010	0.00
October 13, 2010	0.00
October 14, 2010	0.00
October 15, 2010	0.00
October 16, 2010	0.00
October 17, 2010	0.00
October 18, 2010	0.00
October 19, 2010	0.00
Total (9 days prior to visit)	0.00
October Rainfall	0.00
Total (30 days prior to visit)	0.11

2.2 Visual Observations - West Ash Pond

The West Ash Pond, which is located north and west of the main facility buildings, receives bottom ash from the facility. Bottom ash is discharged into the pond through an influent pipe that is supported on an elevated structure as shown on the right side of Photo WAP-4.

2.2.1 West Ash Pond - Embankments and Crest

This pond is almost entirely diked (Photos WAP-6 and WAP-11 through WAP-14). The pond's eastern boundary is incised (Photo WAP-14). A railroad bed is located just to the east of the eastern boundary, with the ground beyond increasing in elevation. The embankment crest is generally well covered with gravel (Photos WAP-1, WAP-13, and WAP-14). The embankment slopes were grass covered; however, much of those areas had an existing grass cover (Photos WAP-5 and WAP-6), or newly surfaced grass cover (Photos WAP-11 and WAP-12), that was not well established. The region and facility had recently suffered through an extremely hot and dry summer that may have affected the condition of the grass surface. Two tree stumps, ruts, an animal burrow, and surface erosion were visible at locations along the southern embankment (Photos WAP-7 through WAP-10).

2.2.2 West Ash Pond - Outlet Control Structures

Decant is discharged from the West Ash Pond to the Secondary Ash Pond through a vertical box weir structure that contains a 36-inch discharge pipe and manually operated gate valve. Water elevation and discharge is controlled through valve operation. The structure and the gate valve operator are located at the southeast corner of the pond (Photos WAP-2 and WAP-3).

2.3 Visual Observations - East Ash Pond

The East Ash Pond, which is located to the east of the West Ash Pond, receives bottom ash from the facility through a pipe supported on an elevated structure as shown in the background of Photo EAP-13.

2.3.1 East Ash Pond - Embankments and Crest

This pond is completely incised and was not in service during the site visit. Photos EAP-1, EAP-5, and EAP-6 show the interior of the East Ash Pond, as well as areas of stacked ash. A drainage swale, to redirect runoff flows away from the pond, exists outside the pond's southeast, east and north perimeter crest road. The crest road is gravel covered as shown on Photos EAP-2, EAP-10, and EAP-11. A piezometer was noted on the northwest crest road (Photo EAP-3). Photo EAP-8 illustrates a gas pipeline indicator located off the northeast crest road.

2.3.2 East Ash Pond - Outlet Control Structure

Decant is discharged from the East Ash Pond to the Secondary Ash Pond through a vertical box weir structure that contains a 36-inch discharge pipe and manually operated gate valve. Water elevation and discharge is controlled through valve operation. The structure and gate valve operator are located in the southwestern corner of the pond (Photo EAP-13).

2.4 Visual Observations - Secondary Ash Pond

The Secondary Ash Pond is located directly adjacent to and to the south of the East Ash Pond. This pond receives decant flow from both the West and East Ash Ponds. The decant flow enters the pond at the northwest corner. Boiler blowdown flow enters the pond on the southwest corner (Photo SAP-2).

2.4.1 Secondary Ash Pond - Embankments and Crest

This pond is entirely incised and the roadway around the pond's perimeter is gravel covered (Photo SAP-1). A piezometer is located on the roadway at the pond's southwest corner (Photo SAP-5).

2.4.2 Secondary Ash Pond - Outlet Control Structure

Discharge from the Secondary Ash Pond to TPDES outfall 006 is by gravity from the southwest area of the pond. Photo SAP-3 shows the discharge headwall, the gate valve operator, and the pond level gauge. The pond level during the site visit measured 353.8 feet.

Additionally, the Secondary Pond provides pumped reuse water for the facility. Photo SAP-6 shows the pond marker indicating the location of the suction pipe and Photo SAP-7 shows the reuse water pump house.

2.5 Visual Observations - Surge Pond

The Surge Pond is triangularly shaped and is located just to the northwest of the facility buildings. This pond receives discharge on its southeast side from the facility flue gas desulfurization scrubbers (Photo SP-7).

2.5.1 Surge Pond - Embankments and Crest

This pond is entirely incised. However, a road and railroad are located along its western boundary. The ground immediately to the west of the railroad slopes away steeply (Photos SP-1 and SP-2). Additionally, there is a below grade limestone unloading area beneath a portion of the railroad (Photo SP-3). A stormwater culvert was visible through the embankment south of the limestone unloading area (Photo SP-4). A monitoring well was noted at the southwest corner of the pond (Photo SP-5).

2.5.2 Surge Pond - Outlet Control Structure

Discharge from the Surge Pond is by pump. Photo SP-6 shows the pumps and platform that are located on the southwest corner of the pond. The pond level gauge indicated the water surface elevation in the Surge Pond during the site visit was 355.4 feet.

2.6 Visual Observations - Auxiliary Surge Pond

The Auxiliary Surge Pond is located north of the Surge Pond and south of the East Ash Pond.

2.6.1 Auxiliary Surge Pond - Embankments and Crest

The northern portion of the Auxiliary Surge Pond is incised, while the remainder is diked (Photo ASP-1 and ASP-2). A piezometer was noted on the southwest corner of the pond embankment (Photo ASP-3).

2.6.2 Auxiliary Surge Pond - Outlet Control Structure

This pond does not contain any outlet/discharge mechanism.

2.7 Visual Observations - Landfill Runoff Pond

The Landfill Runoff Pond receives stormwater runoff and leachate flows from the on-site landfill. This pond is located southwest from the landfill and the main plant buildings. Photo LRP-9 shows the pond as viewed from the top of the landfill. Photo LRP-1 shows the view across the pond from the southern embankment crest looking north.

As shown on Photo LRP-6, flow enters the pond via a trapezoidal channel that is lined with 60-mil HDPE. A monitoring well was noted located to the southeast of the influent channel above the northern reach of the pond (Photo LRP-7).

2.7.1 Landfill Runoff Pond - Embankments and Crest

Embankments, with approximate widths of 10 feet, exist across the southern and western portions of this pond. A flow control diversionary embankment exists along the northwestern pond boundary. The embankment crests are covered in gravel, as shown on Photo LRP-8.

2.7.2 Landfill Runoff Pond - Outlet Control Structure

Flow is discharged from the pond via a gate valve controlled pipe that was constructed across the southern embankment. The upstream outlet control and downstream discharge pipe are shown in Photos LRP-2 and LRP-3, respectively. Although flow was not exiting the pond in the discharge pipe at the time of the site visit, flow was visible adjacent to the pipe discharge location (Photo LRP-4). AEP-SWEPCO personnel responded that the flow was most likely from the pond's under liner drains.

An emergency, earthen spillway was noted to exist to the west of the main discharge pipe, as shown on Photo LRP-8.

2.8 Monitoring Instrumentation

Several monitoring wells and piezometers were noted during the site visit as referenced above. Section 3.4.1, Instrumentation, provides more specific information.

3.0 DATA EVALUATION

3.1 Design Assumptions

AMEC has reviewed provided documentation related to design assumptions regarding both hydraulic adequacy and dike stability. However, some design assumptions were not available in the documentation, and have been listed as not provided where necessary.

3.2 Hydrologic and Hydraulic Design

3.2.1 Long Term Hydrologic Design Criteria

Texas Administrative Code and Texas Commission on Environmental Quality

The ponds at the Pirkey facility, excluding the Landfill Stormwater Runoff Pond, are permitted through the TCEQ Waste Water Division because, according to comments provided by AEP, they function as waste water treatment facilities. As such, the ponds are not subject to the criteria used to determine size and hazard classification for dams found in Texas Administrative Code (TAC), Title 30, Chapter 299, Subchapter B, entitled *Design and Evaluation of Dams* (effective January 1, 2009). The ponds at the Pirkey facility are sized and located such that, if evaluated based on the classification ranges presented in the TAC, they would be considered small, low hazard dams. The minimum design flood hydrograph storm event for proposed, small, low hazard dams, as required per the TAC criteria, is 25% of the PMF. Calculations are to be based on the criteria as set forth in the TCEQ's most recent version of *Hydrologic and Hydraulic Guidelines of Dams in Texas*.

Mine Safety and Health Administration

The Mine Safety and Health Administration (MSHA) provides minimum hydrologic criteria relevant to CCW impoundments in Impoundment Design Guidelines of the Mining Safety and Health Administration (MSHA) Coal Mine Impoundment Inspection and Plan Review Handbook (Number PH07-01) published by the U.S. Department of Labor, Mine Safety and Health Administration, Coal Mine Safety and Health, October 2007.

When detailing impoundment design storm criteria, MSHA states that dams need "to be able to safely accommodate the inflow from a storm event that is appropriate for the size of the impoundment and the hazard potential in the event of failure of the dam." Additionally, MSHA notes that sufficient freeboard, adequate factors of safety for embankment stability, and the prevention of significant erosion to discharge facilities, are all design elements that are required for dam structures under their review. Additional impoundment and design storm criteria are as shown in Table 3, MSHA Minimum Long Term Hydrologic Design Criteria.

Table 3. MSHA* Minimum Long Term Hydrologic Design Criteria

Hazard Potential	Impoundment Size	
	< 1000 acre-feet < 40 feet deep	**≥ 1000 acre-feet ≥ 40 feet deep**
Low - Impoundments located where failure of the dam would result in no probable loss of human life and low economic and/or environmental losses.	100 - year rainfall**	½ PMF
Significant/Moderate - Impoundments located where failure of the dam would result in no probably loss of human life but can cause economic loss, environmental damage, or disruption of lifeline facilities.	½ PMF	PMF
High - Facilities located where failure of the dam will probably cause loss of human life.	PMF	PMF

*Mining Safety and Health Administration (MSHA) Coal Mine Impoundment Inspection and Plan Review Handbook (Number PH07-01) published by the U.S. Department of Labor, Mine Safety and Health Administration, Coal Mine Safety and Health, October 2007

**Per MSHA, the 24-hour duration shall be used with the 100-year frequency rainfall.

All of the impoundments at the Pirkey facility are sized such that they are in the smaller impoundment size (left) column. In addition, the majority of CCW impoundments at the facility were given a "Low" hazard rating; therefore, according to MSHA, the acceptable hydrologic design level would be the 100-year, 24-hour event. However, the West Ash Pond was given a "Significant" hazard rating, which places it in the category requiring an acceptable level of hydrologic design being the ½ PMF.

Probable maximum flood (PMF) is, per MSHA, "the maximum runoff condition resulting from the most severe combination of hydrologic and meteorological conditions that are considered reasonably possible for the drainage area." Additionally, MSHA notes the designer should consider several components of the PMF that are site specific. These components are said to include: "antecedent storm; principal storm; subsequent storm; time and spatial distribution of the rainfall and snowmelt; and runoff conditions." Basic agreement, it was noted, exists between dam safety authorities regarding "combinations of conditions and events that comprise the PMF;" however, there are "differences in the individual components that are used." MSHA provided the following as a "reasonable set of conditions for the PMF:

- Antecedent Storm: 100-year frequency, 24 hour duration, with antecedent moisture condition II (AMC II), occurring 5 days prior to the principal storm.

- Principal Storm: Probable maximum precipitation (PMP), with AMC III. The principal storm rainfall must be distributed spatially and temporally to produce the most sever conditions with respect to impoundment freeboard and spillway discharge.

- Subsequent Storm: A subsequent storm is considered to be handled by meeting the "storm inflow drawdown criteria," as described subsequently in the document.

With regard to storm influent drawdown criteria, MSHA Impoundment Design Guidelines noted that:

> *Impoundments must be capable of handling the design storms that occur in close succession. To accomplish this, the discharge facilities must be able to discharge, within 10 days, at least 90 percent of the volume of water stored during the design storm above the allowable normal operating water level. The 10-day drawdown criterion begins at the time the water surface reaches the maximum elevation attainable for the design storm. Alternatively, plans can provide for sufficient reservoir capacity to store the runoff from two design storms, while specifying means to evacuate the storage from both storms in a reasonable period of time - generally taken to be at a discharge rate that removes at least 90% of the second storm inflow volume within 30 days……When storms are stored, the potential for an elevated saturation level to affect the stability of the embankment needs to be taken into account.*

In, Mineral Resources, Department of Labor, Mine Safety and Health Administration, Title *30 CFR § 77.216-2 Water, sediment, or slurry impoundments and impounding structures; minimum plan requirements; changes or modifications, certification*, information relevant to the duration of the probable maximum precipitation is given. Sub-section *(10)* of *77.216-2* states that a "statement of the runoff attributable to the probable maximum precipitation of 6-hour duration and the calculations used in determining such runoff" shall be provided at minimum in submitted plans for water, sediment or slurry impoundments and impounding structures.

The definition of design freeboard, according to the MSHA Guidelines, is "the vertical distance between the lowest point on the crest of the embankment and the maximum water surface elevation resulting from the design storm." Additionally, the Handbook states that "Sufficient documentation should be provided in impoundment plans to verify the adequacy of the freeboard." Recommended items to consider when determining freeboard include "potential wave run-up on the upstream slope, ability of the embankment to resist erosion, and potential for embankment foundation settlement." Lastly, the Handbook states, "Without documentation, and absent unusual conditions, a minimum freeboard of 3 feet is generally accepted for impoundments with a fetch of less than 1 mile."

In comments to the Draft Report, AEP noted that the ash impoundments are not under the jurisdiction of MSHA, but should be viewed through criteria of the TCEQ. AMEC does not dispute the fact that the facilities are under the jurisdiction of TCEQ, however, per EPA's directive, the impoundments were assessed using the resources and guidelines as set forth in Sections 1.1 and 3.2.1 of this report.

3.2.2 CCW Impoundments Hydrologic Criteria

<u>West, East, and Secondary Bottom Ash Ponds</u>

The West Bottom Ash Pond is a primarily diked impoundment that receives negligible runoff from outside its perimeter. A drainage interceptor channel exists outside the incised East and

Secondary Bottom Ash Ponds. The channel is located along the east and south sides of the ponds and appears to intercept permitted discharge from the Secondary Pond at that pond's permitted TPDES Outfall 006.

Sargent & Lundy Engineers completed a Wastewater Ponds Permit Data Report (AEPPRK000573), dated April 1984, that describes the hydrologic and hydraulic design capacity of the bottom ash ponds. The ponds, working as a hydraulically connected system, were provided with capacity above the normal operating level "to capture and hold the 10 year - 24 hour runoff from the basin and pond drainage areas." The report further notes that runoff from rainfall in excess of the 10 year - 24 hour storm will be discharged from the Secondary Ash Pond through a spillway. The spillway design capacity was noted to be for the 100-year 24-hour event; additionally, pond freeboard was provided "above the maximum water level" that would result from that 100-year 24-hour event. Clarifying drawings and calculations in support of the hydrologic and hydraulic information presented above were not provided during preparation of the Draft Report.

Surge and Auxiliary Surge Ponds

Information regarding the hydrologic and hydraulic design criteria for the Surge and Auxiliary Surge Ponds was provided in a September 1983 document from Sargent & Lundy (AEPPRK000739). According to the document, the Auxiliary Surge Pond is used only in emergency conditions, when the "thickeners or sludge treatment systems are out of service and cannot process waste slurry from the SO_2 removal system." In such circumstance, the slurry would be placed into the Auxiliary Pond. The document indicates that the Surge Pond and Auxiliary Surge Pond are sized to detain the 10-year 24-hour and 10-year 12-hour rainfall events, respectively (AEPPRK000748). Clarifying calculations in support of the information above were not provided during preparation of the Draft Report.

As noted in Section 2.6.2, entitled Auxiliary Surge Pond - Outlet Control Structure, the Auxiliary Surge does not contain an outlet control structure.

In comments to the Draft report, AEP noted that the regional 100-year 24-hour rainfall event is between 10 and 11 inches. Therefore, AEP asserted, the freeboard of two feet that is maintained in the auxiliary surge pond should be acceptable.

Landfill Runoff Pond

Calculations in the provided documentation (AEPPRK000157) describe the result of a 12-inch rainfall event occurring over the pond and its tributary area. A 12-inch rainfall in eastern Texas is greater than the 100-year, 24-hour event rainfall of 10.7 inches. A "C" factor of 0.5 was used to represent impervious surfaces within the 72-acre watershed. The following calculated values were provided.

Tributary Area:	72 acres
Runoff:	12 inches
Impervious Surface Adjustment Factor:	0.5
Total Runoff volume:	1,568,160 cubic feet
Pond Volume at Elev. 292 ft.:	1,744,794 cubic feet
Pond Volume at Elev. 294 ft:	2,424,000 cubic feet
Volume between Elev. 292 ft. and 294 ft.:	856,000 cubic feet

Although the documentation stated that the 12-inch storm occurred over the pond and its tributary area, a verifiable area breakdown was not provided. It is assumed that the tributary area of 72 acres did not include the 19-acre Landfill Runoff Pond, because the impervious surface adjustment factor was applied to the entire 72 acres instead of just that portion outside the pond. AMEC approximates that a 12-inch rainfall distributed over the 19-acre pond would result in nearly 828,000 cubic feet of additional rainfall volume. Therefore,

Recalculated Total Runoff Volume (including impervious pond area):	2,395,800 cubic feet
Pond Volume at Elev. 294 ft.:	2,424,000 cubic feet
Recalculated Volume between Elev. 292 ft. and 294 ft.:	28,200 cubic feet

Overall, the calculations lacked clarity. Other supportive information such as drawings and additional calculations were not provided during preparation of the Draft Report.

Additional provided documents (AEPPRK000155) note that the Landfill Pond was designed "to contain the entire runoff anticipated from the 25-year 24-hour rainfall event." With regards to piping, the document stated that "Piping has been designed to allow complete drainage of the sedimentation ponds in a period of less-than 24-hours." Further, the pond's spillway was designed with the capacity to pass the difference between the 25-year event and the 100-year event. Basins "were designed to include a minimum of two feet of freeboard above the height of the 25-year storage capacity." Supporting piping, spillway design, and routing calculations documentation was not provided.

3.2.3 Recent Hydrologic and Hydraulic Criteria

The May 2011 report entitled *Hydrology & Hydraulic Report North Surge Pond, East & West Ash Ponds, Secondary Ash Pond, and the Landfill Pond*, by Johnson & Pace Incorporated (J&PI) of Longview, Texas was provided by AEP in their comments to the Draft Report. The Surge Pond was not evaluated. The North Surge Pond is referred to in this *Report of Dam Safety* as the Auxiliary Surge Pond.

The Soil Conservation Service's (SCS) curve number method was used in the hydrologic analyses of all ponds. J&PI evaluated the 10-yr, 24-hr rainfall event "in accordance with section 3G on page 13 of the TPDES Permit No. WQ0002496000, dated May 17, 2007." The rainfall depth for that event is 7.1 inches. Additionally, the report provided analysis of 25% of the Probable Maximum Precipitation (PMP), or "worst case situation." The rainfall depth used for evaluation of 25% PMP (72-hour duration PMP of 51 inches) was 12.8 inches. Due to the lack of off-pond tributary area, J&PI noted that a simplistic approach, where precipitation was equated to runoff, was utilized for the hydrologic analyses of each Bottom Ash Pond as well as the North (Auxiliary) Surge Pond.

In their report, J&PI noted that due to the "complexity of the Landfill Pond a more elaborate approach" to the hydrologic analyses was necessary. According to J&PI, the "Pirkey Power Plant anticipates that routine operations will generate additional FGD Sludge, thereby increasing the landfill area which will contribute runoff to this pond, consequently affecting the existing storage capacity." Therefore, J&PI's evaluation of the 10-yr, 24-hr storm was used as the "basis of the expansion plan." A hydrologic soil group "C" was used and, as is recommended for East Texas, J&PI calculated an adjusted curve number of 89.7 for existing conditions and 90.5 for proposed conditions. Based on results of the existing conditions hydrologic evaluation, J&PI determined that the Landfill Runoff Pond does not currently have the capacity to contain the 10-yr, 24-hr tributary runoff at a maximum elevation of 2 feet below the existing spillway elevation,

per the plant's TPDES Permit. Therefore, design of an expansion would be necessary, according to J&PI, "to increase the overall capacity for the existing and proposed future condition." According the J&PI report, the Landfill Runoff Pond capacity will be enlarged by "increasing the surface area of the pond footprint, raising the pond embankment and de-silting the existing pond bottom." J&PI noted that "a series of simulations were performed for different durations of the PMP (1, 2, 3, 6, 12, 24, 48 and 72 hours) to ascertain the exact storm duration that resulted in the maximum water surface elevation." The maximum water surface elevation "was attained during 25% of the 12-hr PMF with a precipitation of 9.3 inches." Table 4, as provided in the J&PI report, illustrates results of the Landfill Runoff Pond hydrologic analyses for the existing pond conditions as well as those of the proposed pond conditions.

Table 4. Summary of Existing and Proposed Landfill Runoff Pond Conditions

Criteria	Existing Condition	Proposed Condition
Runoff Storage	68.65 ac-ft	82.94 ac-ft
Height of Embankment	296.0 ft msl	302.0 ft msl
Spillway Crest Elevation	294.5 ft msl	300.0 ft msl
Surface Area at Spillway Crest	10.0 ac	15.64 ac
Nominal Storage at Spillway Crest	49.73 ac-ft	121.25 ac-ft
Storage at 2 ft below Spillway Crest	30.92 ac-ft	90.63 ac-ft

Values in Table 5, provided in the J&PI report as well, summarize the results of the hydrologic calculations for the all Bottom Ash Ponds, North (Auxiliary) Surge Pond, and the Landfill Runoff Pond.

Table 5. Summary of Pond Hydraulic Characteristics

Ash Pond	Top of Embankment (ft)	2 Feet Freeboard Elevation (ft)	Operating Elevation (ft)	10-Yr, 24-Hr Water Surface Elevation (ft)	25% PMF Water Surface Elevation (ft)
West Bottom Ash	357.00	355.00	354.00	354.64	356.13
East Bottom Ash	357.00	355.00	354.00	354.62	356.11
Secondary Bottom Ash	357.00	355.00	354.00	354.74	356.28
North (Auxiliary) Surge Pond	376.00	374.00	373.00	373.62	375.09
Landfill Runoff Pond	302.0 (Top of Embank) & 300.0 (Spillway Elevation)	298.00	288.00	297.43	301.63

It should be noted that the 10-year 24-hour water surface elevations are shown with respect to the noted operating elevation. However, water surface elevations resulting from the 25% PMF

storm event are shown with respect to the 2 feet of freeboard elevation. When the 25% PMF storm event is based on the operating elevation instead, a freeboard of slightly less than 2 feet would result.

MSHA guidelines for Low hazard facilities indicate that the facilities should be capable of storing or safely passing the 100-year 24-hour design storm. That frequency and duration rainfall depth for Harrison County, Texas, as reported by NOAA, is between 10 and 11 inches. The freeboard available above the design storm water surface elevation would then be reduced by that depth for basins that lack an exterior tributary watershed (self-contained basins). As indicated by the reported top of embankment and operating elevations shown in Table 5, the West, East, and Secondary Bottom Ash Ponds will each maintain a freeboard of just over two feet following a 100-year, 24-hour rainfall event.

The water surface elevation in the Landfill Runoff Pond following a 25% PMF storm event of 12.8 inches, indicates less than 5 inches of freeboard remains in the pond as the spillway at elevation 300.0 feet is used to discharge the runoff. Results from the slightly lower rainfall produced by the 100-year 24-hour storm event (approximately 11 inches compared to 12.8 inches) would be similar to those produced by the 25% PMF storm event and provide less than desirable freeboard during spillway passage of the storm runoff. In order to provide additional freeboard during 100-year 24-hour storm routing from the Landfill Runoff Pond, AMEC recommends reinvestigating the design of the spillway length/elevation in combination with the pond crest elevation.

3.3 Structural Adequacy & Stability

3.3.1 Comparative Stability Factor of Safety Standards

Two well regarded sources for embankment design and evaluation criteria include The United States Army Corps of Engineers (USACE) and the United States Mine Safety and Health Administration (MHSA). Minimum recommended factors of safety for different loading conditions can be found in those agency publications, as shown in Table 6 below.

Table 6. Minimum Stability Factors of Safety

Loading Condition	MSHA[1]	USACE[2]
Rapid Drawdown	1.3	1.1[3] - 1.3[4]
Long-Term Steady Seepage	1.5	1.5
Earthquake Loading	1.2	---[5]

[1] Coal Mine Impoundment Inspection and Plan Review Handbook, 2007, US Mine Safety and Health Administration
[2] Slope Stability Publication, EM1110-2-1902, 2003, US Army Corps of Engineers, Table 3-1: New Earth and Rock-Fill Dams
[3] Applies to drawdown from maximum surcharge pool
[4] Applies to drawdown from maximum storage pool
[5] Referred to USACE Engineer Circular "Dynamic Analysis of Embankment Dams" document that is still in preparation

To analyze the structural adequacy and stability of the ash ponds at the Pirkey Power Plant, AMEC reviewed stability analysis material provided by SWEPCO with respect to the load cases shown in Table 4. Factors of safety documented in the provided material were compared with those factors outlined in the table to help determine whether the impoundments meet the requirements for acceptable stability.

3.3.2 October 2010 Embankment Investigation

In October 2010, ETTL Engineers & Consultants completed an investigation entitled *Pirkey Power Station, Existing Ash, Surge, Lignite and Limestone Runoff, and Landfill Stormwater Ponds Embankment Investigation* (AEPPRK000001). Slope stability analyses descriptions and results will be presented for the West Ash Pond, the Auxiliary (North) Surge Pond, and the Landfill Runoff Pond. ETTL did not perform stability analyses for the East Ash, Secondary, or Surge Ponds due to the incised design of those ponds.

Soil borings were advanced at the crests and the toe of outside embankments. Several laboratory tests were performed on the samples; those tests include Standard Penetration, Atterberg liquid and plastic limits, Percentage of Fines Passing the No. 200 sieve and Natural Moisture content, Unconsolidated Undrained Triaxial tests, Hydrometer, Permeability, and Direct Shear. The report noted the tests were "conducted to classify the soil strata according to widely used engineering classification system; identify, and provide quantitative data for soils; define shear strength characteristics; predict total settlement; and determine the slope stability of the existing embankments.

Table 7 summarizes borings that were advanced, piezometers that were installed, and descriptions of soils that were encountered.

Table 7. Stability Analysis Boring, Piezometer, and Soils Summary

Pond ID	Boring ID (depth, ft)	Piezometer ID (depth, ft)	Soil Summary
West Ash	W-1 (50)	PW-1 (50)	Berm fill material is primarily stiff to very stiff lean clay (CL) and/or fat clay (CH), overlying native soils consisting primarily of medium dense to very dense clayey sand (SC) with layers of dense gravel (GC) and very dense silty clayey sand (SC-SM).
West Ash	W-2	None	
West Ash	W-3 (50)	PW-3 (50)	
West Ash	W-4	None	
North Surge	S-1 (50)	PS-1 (50)	Berm fill material is primarily stiff to very stiff lean clay (CL) and /or fat clay (CH) overlying the native soils which consist of stiff to very stiff lean clay (CL) and /or fat clay (CH) with medium dense to very dense clayey sand (SC) near the terminal depth.
North Surge	S-2	None	
Landfill Runoff	L-1 (50)	PL-1 (50)	Berm fill material is primarily stiff sandy lean clay (CL) overlying the native soils which consist of loose to very dense silty sand (SM), silty clayey sand (SC-SM), and sandy silt (ML) with a lignite layer and hard lean clay (CL) near the terminal depth.
Landfill Runoff	L-2	None	

The Geostase computer program, developed by Gregory Geotechnical Software, was used to evaluate slope stability. It was noted that "the program calculates the factor of safety for potential failure circles using several different methods," and that "these analyses were conducted using the modified Bishop method."

Although the embankments were noted to have been surveyed as part of this stability analysis, it was noted that "some of the ponds had significant amounts of water (or ash) which hindered the measurement of the upstream toe of slope." Therefore, those locations "were predicted based on the constructed slope angles and a topographical survey conducted prior to the construction of the ponds."

Worst case embankments, chosen "based on visual observations during the initial site visit", were modeled. Figure 9 illustrates the location of each stability cross section. Soil strengths were noted to have been "modeled using 85 percent of the strength values determined from testing where a test was conducted." Where triaxial tests were not conducted, the report noted that "average values of the fill and native soils were used based on soil types." Finally, to accommodate possible variations in the soil, ETTL engineers reduced determined soil strengths by 15 percent. Table 8 summarizes the results of Triaxial and Direct Shear tests.

Table 8. Summary of Triaxial and Direct Shear Tests

Boring	Depth Range (ft)	Fill or Native	Soil Classification	Effective Stress Parameters		Total Stress Parameters	
				Cohesion (psf)	Friction Angle	Cohesion (psf)	Friction Angle
R-1*	8-11	F	SC w/gr	490	27.6	760	15.5
R-3*	5-7	N	SC	335	32.6		
LR-1*	13-15	N	SC	70	33	675	15
W-1	13-20	F	CH	660	17.5	500	13.3
W-1	38-40	N	SC	290	29.7	0	30.4
W-2	13-16	N	SC	685	33.5		
W-3	10-20	N	CH	360	19.3	590	14.9
S-1	5-10	F	CH	0	33.9	260	19
S-2	28-30	N	CH	650	21.9	590	14
S-3	5-10	N	CL	475	18.5	520	12.6

*Non-CCW ponds, included here because Triaxial and Direct Shear results were used to determine and average characteristic values.

The report notes that the "four native clayey sands (SC), three native clays (CL/CH), [and] two fill clays (CH) in the table were averaged and used in several of the analyses." Relatively undisturbed sandy soil samples were not obtained; therefore, "these soils were modeled using conservative estimates of the friction angle based on the SPT blow counts according to published data." No parameter results from Triaxial and Direct Shear Tests were reported for the Landfill Runoff Pond (L-1 and L-2). Clarification of these Landfill Runoff Pond parameters should be provided. Additionally, clarification should be provided regarding the steps taken as well as the calculations and assumptions that were utilized to determine the values provided in Table 6.

Results of the stability analyses were provided for each slope and included long-term steady state, steady state with seismic loads, and rapid drawdown load cases. The report noted that the West Ash Pond was analyzed for rapid drawdown without the ash since the ash, currently present in the pond, will likely be removed. Effective stress parameters were used when evaluating steady-state conditions; however, total stress parameters were used for the rapid drawdown analysis. Table 9 provides a summary of the calculated factors of safety. The required minimum factors, per ETTL, are provided below the parameter type.

Table 9. Summary of Soil Stability Analyses Factors of Safety

Pond	Factor of Safety		
	Steady State (>1.5)	Steady State with Seismic (>1.2)	Rapid Drawdown (>1.3)
West Ash Section #1 (NW corner)	2.6	1.8	2.2
West Ash Section #2 (South berm)	2.0	1.5	2.0
North Surge	2.6	1.6	2.8
Landfill Stormwater	3.7	1.8	2.2

The results of the stability analyses indicate that each embankment's calculated factor of safety exceeded the industry regarded minimum for each condition.

3.4 Foundation Conditions

Information regarding impoundment foundations is provided in the October 2010 *Pirkey Power Station, Existing Ash, Surge, Lignite and Limestone Runoff, and Landfill Stormwater Ponds Embankment Investigation* (AEPPRK000001), completed by ETTL Engineers & Consultants Inc. ETTL notes that the primary embankment materials are cohesive soils consisting of lean clay (CL) and/ or fat clay (CH). Additionally, seams and soft or loose soils were not encountered.

3.5 Operations and Maintenance

A safety assessment of the ash pond dikes was performed on March 19 and 20, 2009 by URS Corporation in conjunction with an inspection of the Brandy Branch Dam (AEPPRK000269).

Concerning the West Ash Pond, the only observed deficiencies "were heavy tree growth on the outside slopes, and some areas of sparse vegetative covering." "Tree growth consisted of large pine trees in excess of 16 inches in diameter." Additionally, "minor erosion was noted on the slopes."

Brushy vegetation was observed on the west dike of the Auxiliary Surge Pond, but URS noted that "all trees along the dike have been cut." Poor vegetation had resulted in some rilling on the slopes. URS reported that, "Soils are acidic according to AEP reports and maintaining grass cover has been difficult."

With respect to the Landfill Runoff Pond, URS noted that inspection of the dike "revealed mostly good vegetative cover with some bare areas along the west dike. The emergency spillway was noted to be in good condition. Although the pond had been overtopped previously according to AEP, "no erosion was observed along the dike itself." URS recommended that AEP "verify the hydraulic adequacy of this pond as soon as possible to ensure that the dam can safely pass the design flood flows without overtopping."

According to AEP's response to EPA's Request for Information, the next safety assessment is scheduled for the year 2012. AEP considers the Pirkey facility to be Low Hazard.

In comments to the Draft report regarding the timing of the next scheduled safety assessment of 2012, AEP noted that it:

is based on the size and hazard rating of the facilities per TCEQ inspection guidelines which relates to an inspection performed by a professional engineer. This time period of 3 years is the maximum frequency.

AEP provided additional information concerning their inspection and maintenance programs, saying:

AEP has a well developed program in the area of dam safety, inspections and maintenance, referenced as Dam Inspection and Maintenance Program (DIMP). As part of the DIMP, AEP has established minimum frequency and criteria for inspections. Quarterly inspections of the facility are performed by Plant personnel and AEP Engineering conducts periodic inspections.

Additionally, with respect to AEP's formal inspection program, AEP noted that:

The program is consistent with State and FEMA guidelines…….Additionally, documented quarterly inspections by plant personnel are performed and the plant staff provides visual observation of the facilities at least weekly, if not daily, as part of normal operations. In 2010, AEP recommended that these visits be documented in a written log that includes the day/time and any conditions noted. AEP believes that this is a sufficient level of inspections for the size and hazard facilities at the Pirkey Plant.

AEP included a sample of the inspection form they would be using in the Draft Report comments. Columns for "Inspection Issue #" and "Comments" were included on the form. It is AMECs opinion that this inspection form is too minimal and would not serve SWEPCO and AEP well as a reference and condition tracking document.

3.5.1 Instrumentation

Provided documentation indicates that the Pirkey Plant currently has seventeen groundwater quality monitoring wells in operation. These wells are sampled semi-annually. Figure 10 illustrates well location and Table 10 provides a well summary (AEPPRK000370). A summary of the previous five year's groundwater elevation data for these monitoring wells is included in Appendix D.

Table 10. Monitoring Well Summary

Well ID	Date Installed	Reported Well Depth (ft)	Top of Casing Elev. (ft)
M-2	January 1986	29.46	305.02
M-3	July 1993	38.35	355.26
MW-1	October 1983	28.83	335.75
MW-2	October 1983	41.00	342.08
MW-3	October 1983	57.75	372.79
MW-4	October 1983	45.92	365.78
MW-5	October 1983	47.67	365.50
MW-6	October 1983	42.08	363.67
MW-7	October 1983	38.83	359.72
MW-8	October 1983	29.33	358.05
MW-9	October 1983	29.63	355.35
MW-10	October 1983	41.83	360.60
MW-11	January 1986	45.92	364.61
MW-12	January 1986	48.83	380.99
MW-13	February 1988	40.42	364.35
MW-14	February 1988	42.42	363.67
MW-15	February 1988	40.83	361.60

Monitoring wells are constructed with cement/bentonite grout, a bentonite seal thickness of two feet above the screen, a screen length of 10 feet, and screen slot openings of 0.010 inches. A sand and gravel pack is used as typical screen filter material.

A total of nine piezometers were installed at the Pirkey facility in October 2009 in support of the geotechnical investigation performed by ETTL Engineers & Consultants Inc. (AEPPRK000001). The piezometers were constructed of schedule 40, 2-inch diameter, PVC pipe consisting of new, box-wrapped, flush-jointed threaded screen (0.010-inch mil slot) and casing. Six of the piezometers were installed at CCW impoundments and are as shown on Table 11.

Table 11. Piezometers Located at CCW Impoundments

Piezometer ID	Depth (feet)	Location
PE-1	30	North side of East Ash Pond
PE-3	30	South side of Secondary Ash Pond
PL-1	50	South side of Landfill Runoff Pond
PS-1	50	South side of Auxiliary (North) Surge Pond
PW-1	50	West side of West Ash Pond
PW-3	50	South side of West Ash Pond

3.5.2 State or Federal Inspections

The Texas Commission on Environmental Quality performed an "investigation of ash management operations" at the Pirkey Plant on January 13, 2009 (AEPPRK000313). The West and East Ash Ponds, as well as on-site Landfill, were inspected on this date. The Surge Ponds and Landfill Runoff Pond were not inspected. The only noted issue was the tree growth on the west side of the West Ash Pond. AEP officials responded that this issue had already been identified as a maintenance concern and that the trees would be removed. No future State inspections have been scheduled.

4.0 COMMENTS AND RECOMMENDATIONS

Condition assessment definitions, as accepted by the National Dam Safety Review Board, are as follows:

SATISFACTORY

No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria or tolerable risk guidelines.

FAIR

No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

POOR

A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. POOR may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Further investigations and studies are necessary.

UNSATISFACTORY

A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

NOT RATED

The dam has not been inspected, is not under state jurisdiction, or has been inspected but, for whatever reason, has not been rated.

4.1 Acknowledgement of Management Unit Conditions

I certify that the management units referenced hereinafter were personally assessed by me and was found to be in the following condition:

West Ash Pond: Fair

East Ash Pond: Satisfactory

Secondary Ash Pond: Satisfactory

Surge Pond: Satisfactory

Auxiliary Surge Pond: Fair

Landfill Runoff Pond: Poor

In the Draft Report the West Ash Pond, Auxiliary Surge Pond, and Landfill Runoff Pond were rated poor due to the lack of critical analyses which would verify the unit's stability under required loading conditions. Namely, for these ponds, sufficient storage or runoff routing ability for the hydrologic event equivalent to the hazard condition specified for the facility. Materials provided by AEP in comments to the Draft Report addressed these areas of concern. As a result, the ratings for the West Ash Pond and Auxiliary Surge Pond were changed to Fair. However, the provided materials show the existing Landfill Runoff Pond is not designed to sufficiently pass even the 10-year 24-hour storm. As a result, that rating will remain Poor. The EPA is currently working to complete final rules for the CCW assessment program. Additionally, condition ratings noted in this *Report of Dam Safety Assessment of Coal Combustion Surface Impoundments* represent a snapshot in time. If the following recommendations are implemented and acceptable levels of protection are shown, it may be possible to improve the condition ratings if the CCW impoundments were to be re-evaluated in the future.

In addition, although the factors of safety determined in the 2010 Embankment Investigation were acceptable for the Landfill Runoff Pond, Triaxial and Direct Shear values for the Landfill Runoff Pond were not provided in the Investigation. However, comments to the Draft Report provided by AEP outlined the reasoning behind the selection of geotechnical parameters. AMEC considers the issue resolved.

4.2 Hydrologic and Hydraulic Recommendations

In comments to the Draft report, AEP took exception to the application of MSHA criteria to the hydrologic and hydraulic operations of the ash ponds. Per EPA's directive, the impoundments were assessed using the resources and guidelines as set forth in Sections 1.1 of this report.

In comments to the Draft report, AEP concurred that "a revised hydraulic analysis may be beneficial to perform according to the current criteria established by the Texas Commission on Environmental Quality for small, low hazard dams, for completeness and updating the records." The May 2011 *Hydrologic & Hydraulic Report* authored by Johnson & Pace Incorporated and included in AEP's comments to the Draft Report, provided that revised hydraulic analysis and summary of pond freeboard resulting from design storm events for the West Bottom, North (Auxiliary) Surge, and Landfill Runoff Ponds.

4.2.1 West Bottom Ash Pond

Draft Report

AMEC recommends that an appropriate design storm rainfall and freeboard depth in accordance with MSHA guidelines be applied to the impoundment„s watershed to assess whether the dam and decant system can safely store, control, and discharge the design flow. Based on the size and hazard rating for the West Bottom Ash Pond, the design storm per MSHA guidelines would be the ½ PMF. Hydraulic calculations should also be completed to determine the rate at which the discharge structure and associated piping could pass the design storm, if necessary, or draw down elevated water surfaces following such an event. The analysis should consider all critical stages over the life of the pond including full pond conditions. Additionally, the analysis should take into account the connectivity between the West, East, and Secondary Bottom Ash Ponds.

Final Report

A “Significant Hazard” potential was originally assigned to the West Ash Pond. However, following receipt of Draft Report comments from AEP, the hazard potential of the West Ash Pond was changed from “Significant” to “Low” as described in Section 1.2 of this report. That hazard potential change resulted in reduction of the required MSHA design storm criteria from ½ PMF to 100-Year 24-hour.

The West Bottom Ash Pond, shown to operate at elevation 354.0 feet, would be capable of containing the 100-year 24-hour design storm of between 10 and 11 inches while maintaining a freeboard of approximately two feet based on the reported crest elevation of 357.0 feet. Ideally, per MSHA and other frequently referenced sources, a freeboard of three feet should exist above the maximum water surface elevations that result from a design storm.

4.2.2 East Bottom Ash Pond

The East Bottom Ash Pond is incised, therefore, no hydrologic or hydraulic recommendations are provided.

4.2.3 Secondary Bottom Ash Pond

The Secondary Bottom Ash Pond is incised, therefore, no hydrologic or hydraulic recommendations are provided.

4.2.4 Surge Pond

The Surge Pond is incised, therefore, no hydrologic or hydraulic recommendations are provided.

4.2.5 Auxiliary Surge Pond

Draft Report

AMEC recommends that an appropriate design storm rainfall and freeboard depth in accordance with MSHA guidelines be applied to the impoundment‟s watershed to assess whether the dam can safely store the design flow, as there is no decant or discharge capability in this pond. Based on the size and rating for the Auxiliary Surge Pond, the design storm, per MSHA recommendations, would be the 100-year 24-hour event.

If it is determined that addition of a discharge structure is warranted, hydraulic calculations should also be completed to determine the rate at which the discharge structure and associated piping could pass the design storm, if necessary, or draw down elevated water surfaces following such an event. The analysis should consider all critical stages over the life of the pond including full pond conditions.

Final Report

The Auxiliary Surge Pond, shown to operate at elevation 373.0 feet, would be capable of containing the 100-year 24-hour design storm of between 10 and 11 inches while maintaining a freeboard of approximately two feet based on the reported crest elevation of 376.0 feet. Ideally, per MSHA and other frequently referenced sources, a freeboard of three feet should exist above the maximum water surface elevations that result from a design storm.

4.2.6 Landfill Runoff Pond

Draft Report

URS recommended, following their March 2009 inspection, that AEP "verify the hydraulic adequacy of this pond as soon as possible to ensure that the dam can safely pass the design flood flows without overtopping."

AMEC is in agreement and recommends that an appropriate design storm rainfall and freeboard depth in accordance with MSHA guidelines be applied to the impoundment's watershed to assess whether the dam and outlet system can safely store, control, and discharge the design flow. Based on the size and rating for the Landfill Runoff Pond, the design storm would be the 100-year, 24-hour event. Hydraulic calculations should also be completed to determine the rate at which the discharge structure and associated piping could pass the design storm, if necessary, or draw down elevated water surfaces following such an event.

Final Report

The May 2011 hydrologic and hydraulic analyses completed by Johnson & Pace Incorporated indicated that the proposed spillway design would pass 12.8 inches (25% PMF) of runoff with less than 5 inches of freeboard with respect to the pond's top of embankment elevation. The nearly 11 inches resulting from the 100-year 24-hour design storm (MSHA requirement for Low hazard impoundment) would produce a similar, if slightly greater, freeboard. AMEC recommends that AEP revisit the proposed pond design to produce a spillway/crest elevation combination that will work to provide a freeboard for the 100-year 24-hour design storm routing that would more closely mirror that recommended by MSHA.

4.3 Geotechnical and Stability Recommendations

Draft Report

Regarding the West Bottom Ash, Auxiliary Surge, and Landfill Runoff Ponds, analyses and factors of safety reported in the October 2010 Embankment Investigation met acceptable minimum criteria. However, final verification will be provided once clarification is provided regarding the steps taken, as well as the calculations and assumptions that were utilized to determine the Triaxial and Direct Shear Tests values. These values are provided in Table 6 of this assessment report. Additionally, Triaxial and Direct Shear Test results were not reported for Landfill Runoff Pond borings L-1 and L-2. These values need to be reported.

The East and Secondary Bottom Ash Ponds and the Surge Pond feature incised configurations and geotechnical or stability recommendations are not provided.

Final Report

In their comments to the Draft Report, AEP noted that *USACE Engineering Manual 110-2-1902 Section 3.3 stated that "computed factors of safety less than the preferred values for new dams (FS = 1.5 static conditions) may be acceptable based on past performance and current condition of the dam. It should be pointed out that the Factors of Safety for the*

facilities presented in the report of the independent consultant, ETTL, (Table 6.1.2) meet or exceed the minimum requirement for new dams."

Also, AEP noted that "it is common practice and accepted professional standards that soil properties are selected based on a combination of the results of site specific drilling and testing programs as well as published data and local knowledge of the subsurface conditions. AEP believes that the selection of design parameters for the facilities is well documented in the ETTL report. Additional testing seems to be unwarranted given the Factor of Safety calculated for the facilities."
Based on the response to comments, AMEC considers all issues noted in the Draft Report with regard to the geotechnical stability analyses to have been satisfactorily resolved.

4.4 Monitoring and Instrumentation Recommendations

Associated existing monitoring wells should continue to be sampled semi-annually. In addition, any associated piezometers installed in support of the 2010 Embankment Investigation, should be read semi-annually, as well, with levels recorded.

In order to monitor change of water surface in the West and East Bottom Ash Ponds, a level gauge, similar to those in the Secondary Bottom Ash Pond and Surge Pond, should be added to those ponds. Routine monitoring should be established.

4.5 Inspection Recommendations

Draft Report

Although AEP/SWEPCO believes Pirkey to be a low hazard facility, that does not minimize the need for a more detailed and documented record of inspection activities. AMEC recommends that an inspection program be completed monthly by the plant, as well as being expanded to identify observation date, describe the conditions of crests, embankments, and other areas that are observed, identify potential problems, remark on maintenance response to previous concerns, and note conditions of monitoring instrumentation and pond levels. Inspections of the ponds should be performed after significant rainfall events.

AMEC understands a Professional Engineer performed an inspection in March 2009, and the next inspection is planned for 2012. We recommend this type of inspection program and report by a Professional Engineer be continued at least annually, in addition to the recommended monthly inspections by facility personnel.

The presence of trees, excessive vegetation and animal burrows are also related to the maintenance of the facility. More frequent (monthly) inspections would allow for these maintenance concerns to be recognized and addressed in a timely manner.

Final Report

AMEC noted comments provided by AEP with respect to inspection type and frequency. AMEC continues to recommend standard annual inspections by a professional engineer and well documented monthly inspections by plant personnel as described in the first paragraph of this report section. The inspection form that AEP provided in their comments to the Draft report

should have added columns based on the additional types of information outlined in that first paragraph.

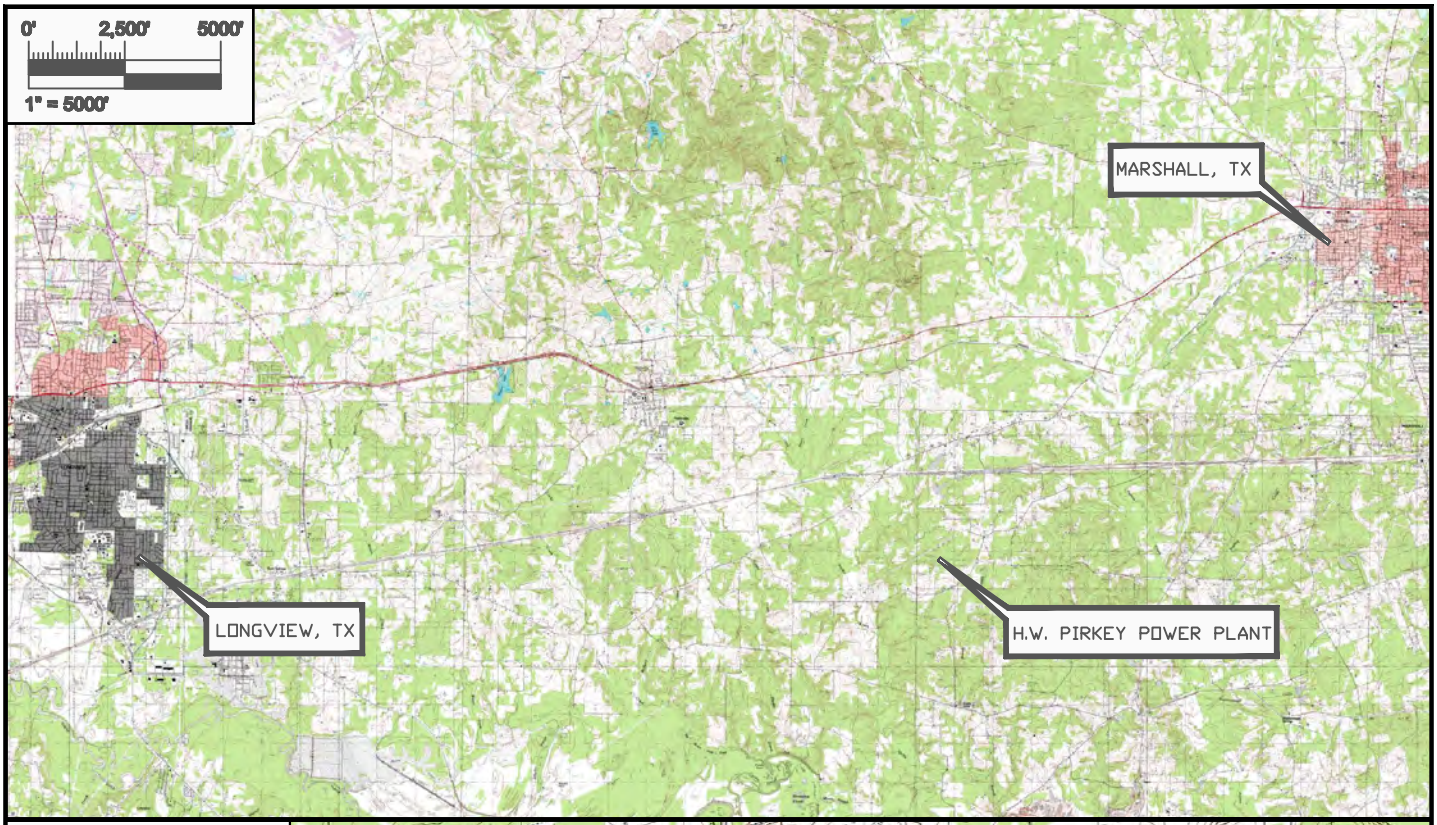
5.0 CLOSING

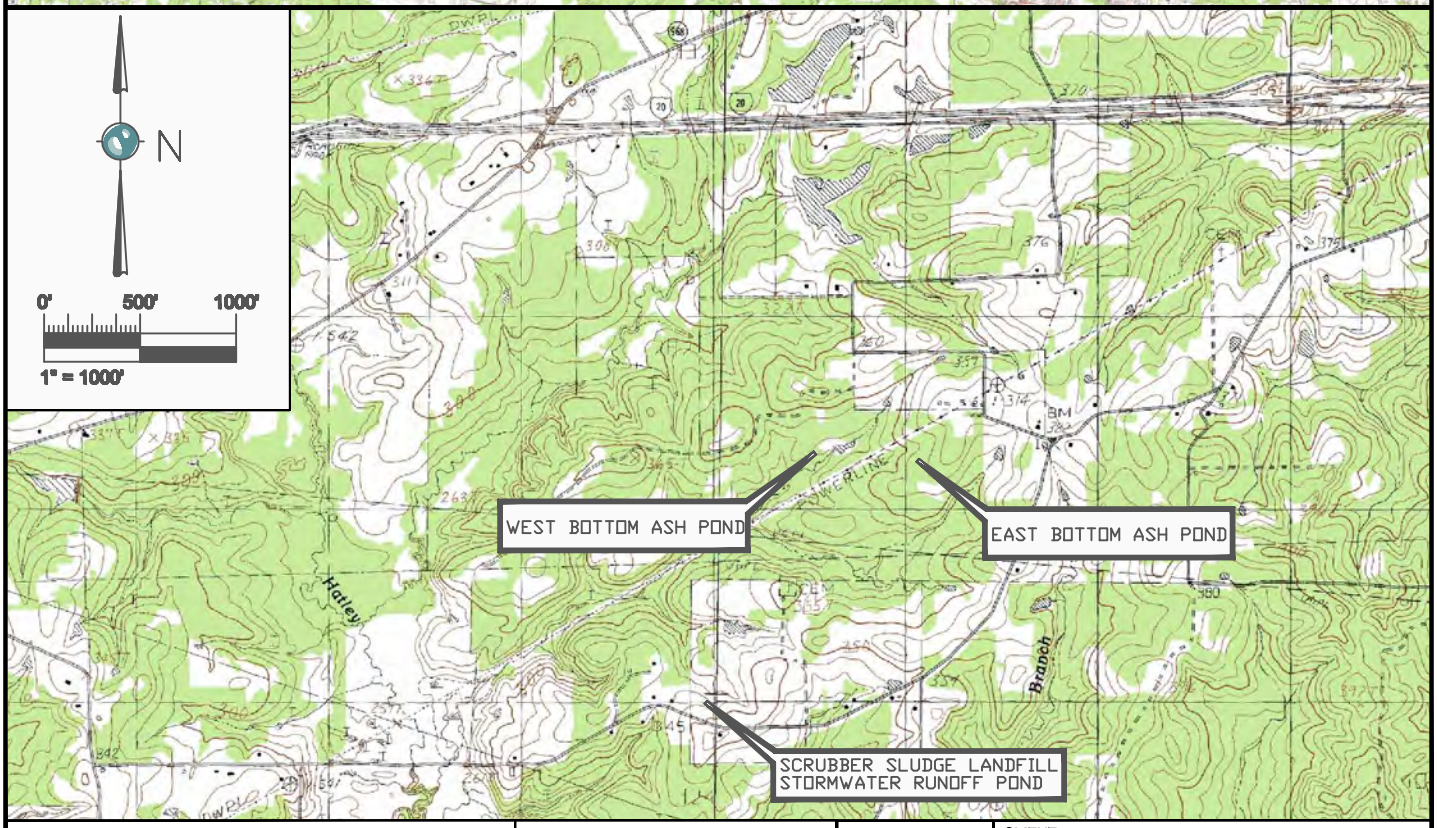
This report is prepared for the exclusive use of the Environmental Protection Agency for the site and criteria stipulated herein. This report does not address regulatory issues associated with storm water runoff, the identification and modification of regulated wetlands, or ground water recharge areas. Further, this report does not include review or analysis of environmental or regional geo-hydrologic aspects of the site, except as noted herein. Questions or interpretation regarding any portion of the report should be addressed directly by the geotechnical engineer.

Any use, reliance on, or decisions to be made based on this report by a third party are the responsibility of such third parties. AMEC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The conclusions and recommendations given in this report are based on visual observations, our partial knowledge of the history of Pirkey impoundments, and information provided to us by others. This report has been prepared in accordance with normally accepted geotechnical engineering practices. No other warranty is expressed or implied.

FIGURES





AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SITE LOCATION & VICINITY MAP

DWN BY:	DATUM:	DATE:
CAE		11/9/10
CHK'D BY:	REV. NO.:	PROJECT NO:
MOS		3-2106-0183.0003
PROJECTION:	SCALE:	FIGURE No.
	AS SHOWN	1

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

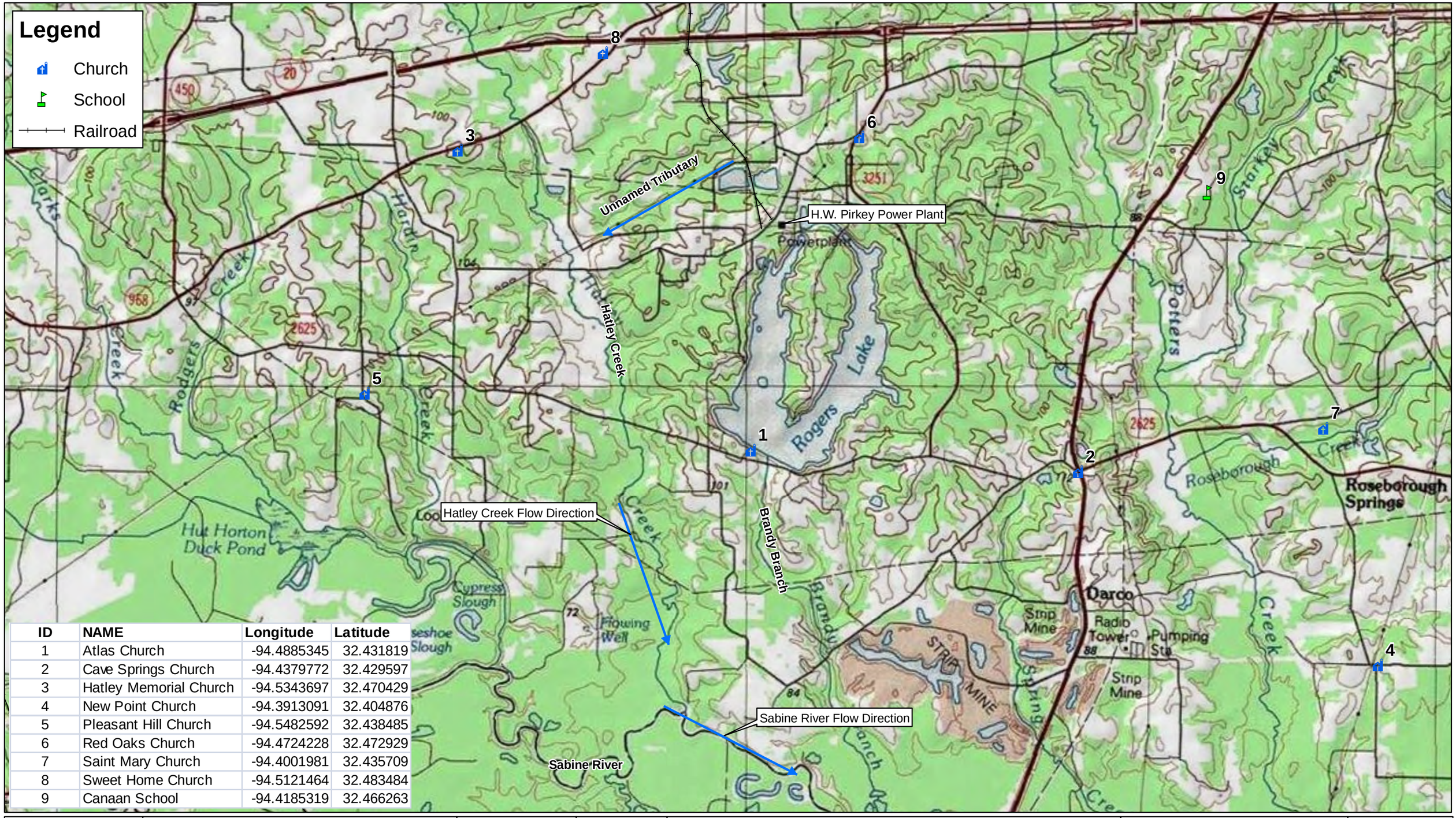
AMEC Earth & Environmental
690 Commonwealth Business Center
11003 Bluegrass Parkway
Louisville, KY 40299

DWN BY: DJC
CKD BY: MS
Datum: NAD 83
Projection: UTM 15
Scale: As Shown

ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

AMERICAN ELECTRIC POWER (AEP) AND SOUTHWEST ELECTRIC POWER COMPANY (SWEPCO)
H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
AERIAL SITE PLAN

REV. No.: A
Date: 11-9-10
Project No: 3-2106-0183-0003
Figure No: 2



ID	NAME	Longitude	Latitude
1	Atlas Church	-94.4885345	32.431819
2	Cave Springs Church	-94.4379772	32.429597
3	Hatley Memorial Church	-94.5343697	32.470429
4	New Point Church	-94.3913091	32.404876
5	Pleasant Hill Church	-94.5482592	32.438485
6	Red Oaks Church	-94.4724228	32.472929
7	Saint Mary Church	-94.4001981	32.435709
8	Sweet Home Church	-94.5121464	32.483484
9	Canaan School	-94.4185319	32.466263

AMEC Earth & Environmental
690 Commonwealth Business Center
11003 Bluegrass Parkway
Louisville, KY 40299

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

DRAWN BY: DJC
CHK'D BY: MS
DATUM: NAD83
PROJECTION: UTM 15
SCALE: AS SHOWN
DATE: 11/9/2010

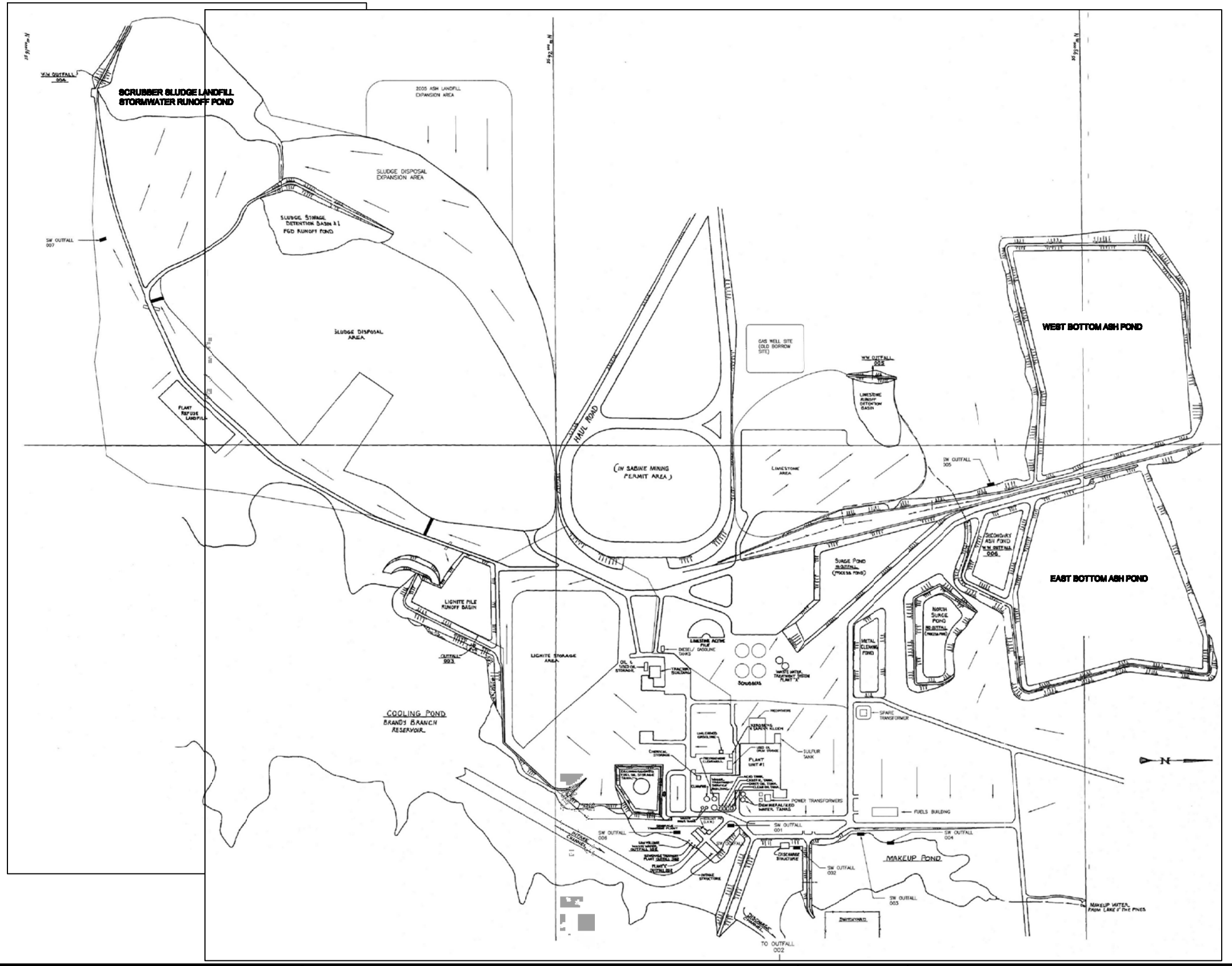
ASSESSMENT OF DAM SAFETY OF
COAL COMBUSTION SURFACE IMPOUNDMENTS

AMERICAN ELECTRIC POWER (AEP) AND
SOUTHWEST ELECTRIC POWER COMPANY (SWEPCO)
H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
CRITICAL INFRASTRUCTURE

N
0 1 Miles
0 1 Kilometers

Notes: Critical infrastructure data provided by ESRI

FIGURE
3



NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC EARTH & ENVIRONMENTAL REPORT

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

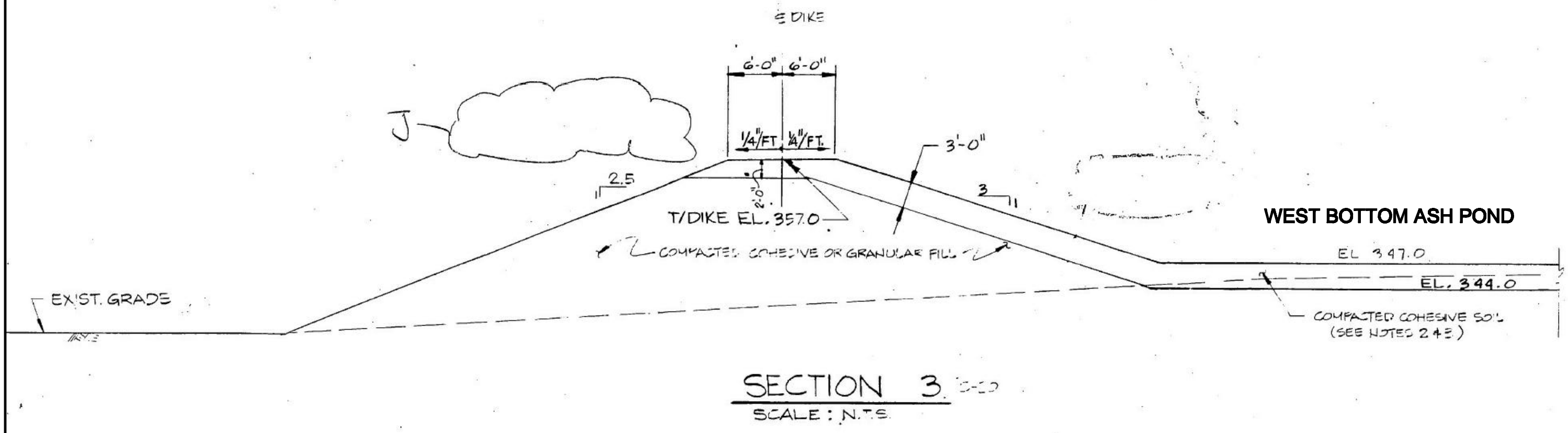
DWN BY:	CAE
CHK'D BY:	MOS
DATUM:	
PROJECTION:	
SCALE:	AS SHOWN

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
PIRKEY SITE STORMWATER FLOW PLAN

DATE:	11/9/10
PROJECT NO:	3-2108-0183.0003
REV. NO.:	
FIGURE No.	4

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\September Round 8\Pirkey\Pirkey Photos and CAD files\cad\pirkeystormwatersiteplan.dwg – Layout1 – Nov. 17, 2010 10:54am – chris.eger



SECTION 3

SCALE : N.T.S.

WEST BOTTOM ASH POND

NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC EARTH & ENVIRONMENTAL REPORT

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

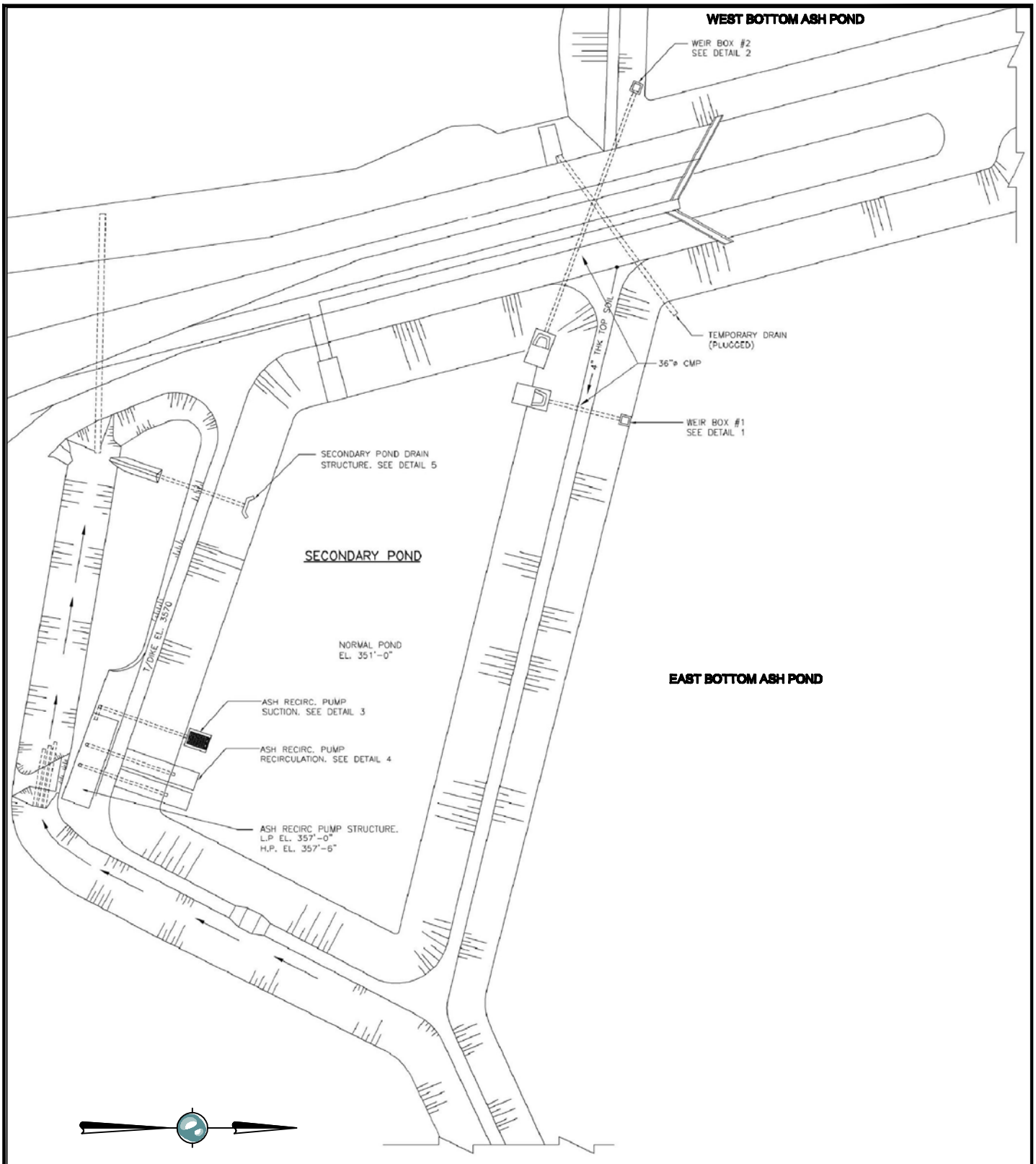
DWN BY:	CAE
CHK'D BY:	MOS
DATUM:	
PROJECTION:	
SCALE:	AS SHOWN

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
TYPICAL CROSS SECTION - WEST ASH POND SOUTH EMBANKMENT

DATE:	11/9/10
PROJECT NO:	3-2108-0183.0003
REV. NO.:	
FIGURE No.	5

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\September Round 8\Pirkey\Pirkey Photos and CAD files\cad\typcswapsouthembankment.dwg — Layout2 — Nov. 17, 2010 11:06am — chris.eger



AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

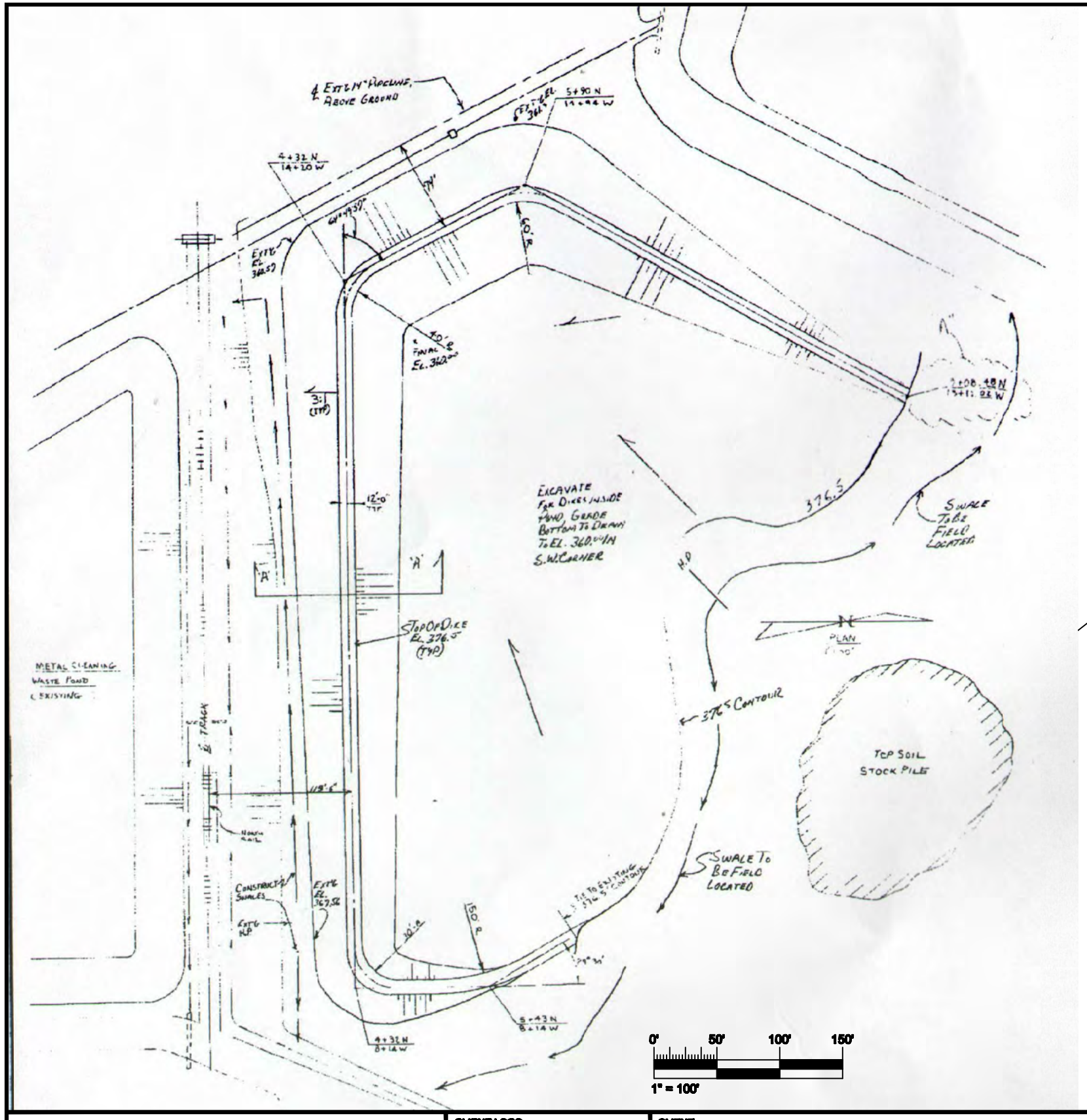
CLIENT LOGO

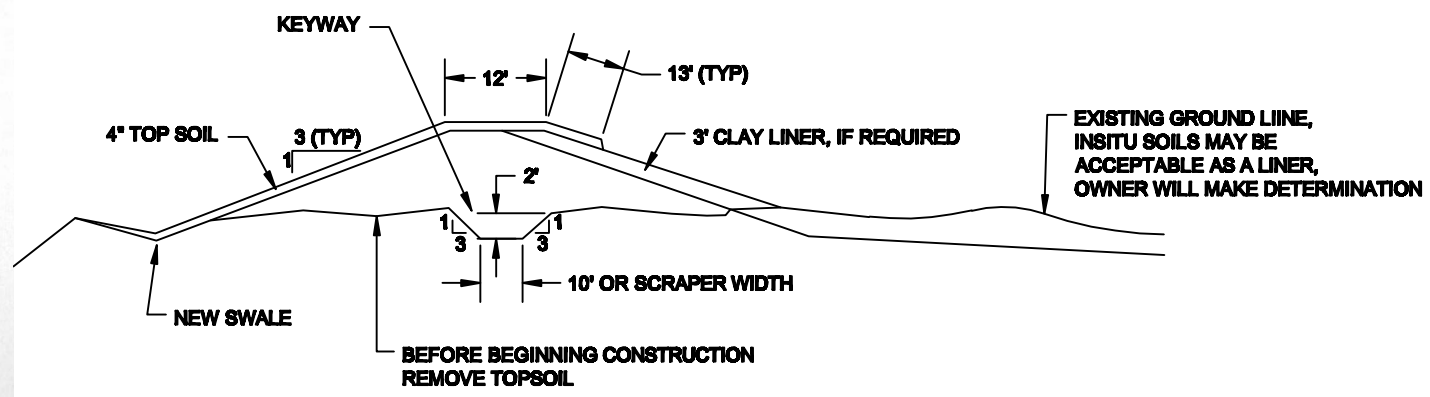
CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX BOTTOM ASH PONDS DISCHARGE STRUCTURE LOCATIONS AND SECONDARY BOTTOM ASH POND PLAN

DWN BY: CAE	DATUM:	DATE: 11/9/10
CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
PROJECTION:	SCALE: AS SHOWN	FIGURE No. 6





SECTION A-A`

NOT TO SCALE

NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC EARTH & ENVIRONMENTAL REPORT

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

AMEC Earth & Environmental
660 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

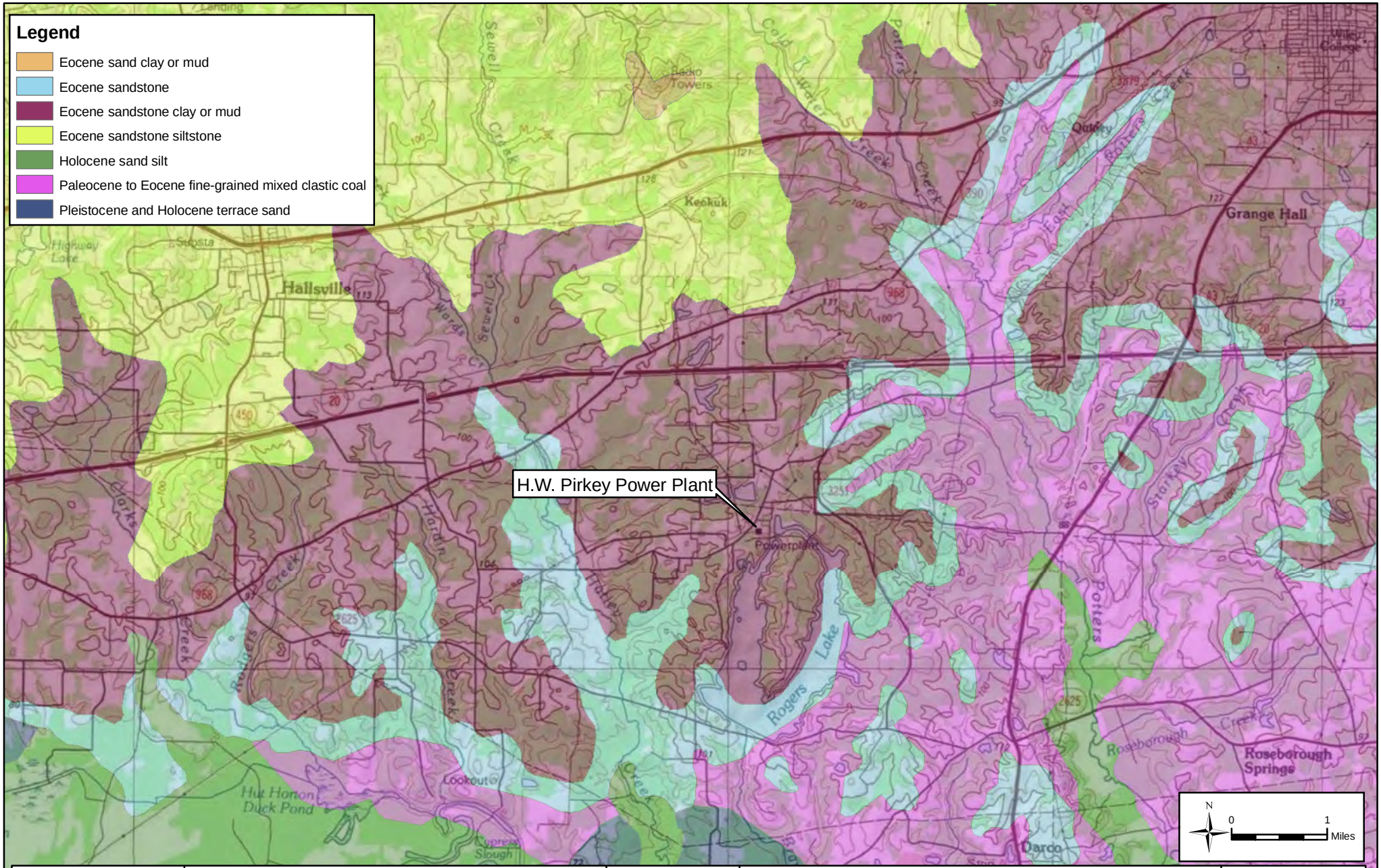
DWN BY:	CAE
CHK'D BY:	MOS
DATUM:	
PROJECTION:	
SCALE:	AS SHOWN

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
AUXILIARY SURGE POND PLAN AND CROSS SECTION

DATE:	11/9/10
PROJECT NO:	3-2108-0163.0008
REV. NO.:	
FIGURE No.	7

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\September Round 8\Pirkey\Pirkey Photos and CAD files\cad\auxiliarynorthsurgepond.dwg – Layout1 – Nov. 17, 2010 11:03am – chris.eger



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

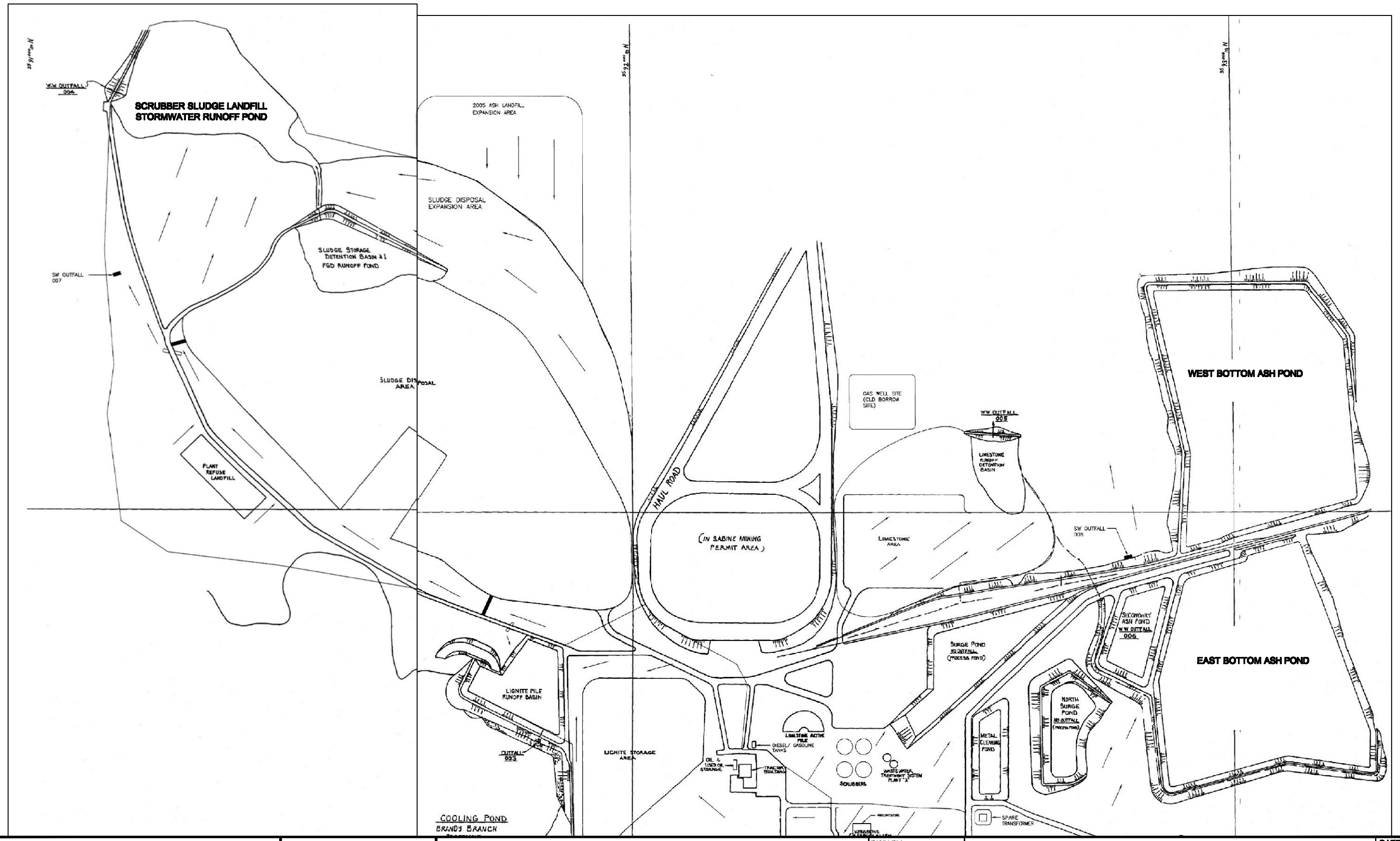
AMEC Earth & Environmental
690 Commonwealth Business Center
11003 Bluegrass Parkway
Louisville, KY 40299

DWN BY: DJC
CKD BY: MS
Datum: NAD 83
Projection: UTM 15
Scale: As Shown

ASSESSMENT OF DAM SAFETY OF
COAL COMBUSTION SURFACE IMPOUNDMENTS

AMERICAN ELECTRIC POWER (AEP) AND
SOUTHWEST ELECTRIC POWER COMPANY (SWEPCO)
H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
GEOLOGIC MAP

REV. No.: A
Date: 11-9-10
Project No: 3-2106-0183-0003
Figure No: 8



NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC EARTH & ENVIRONMENTAL REPORT

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

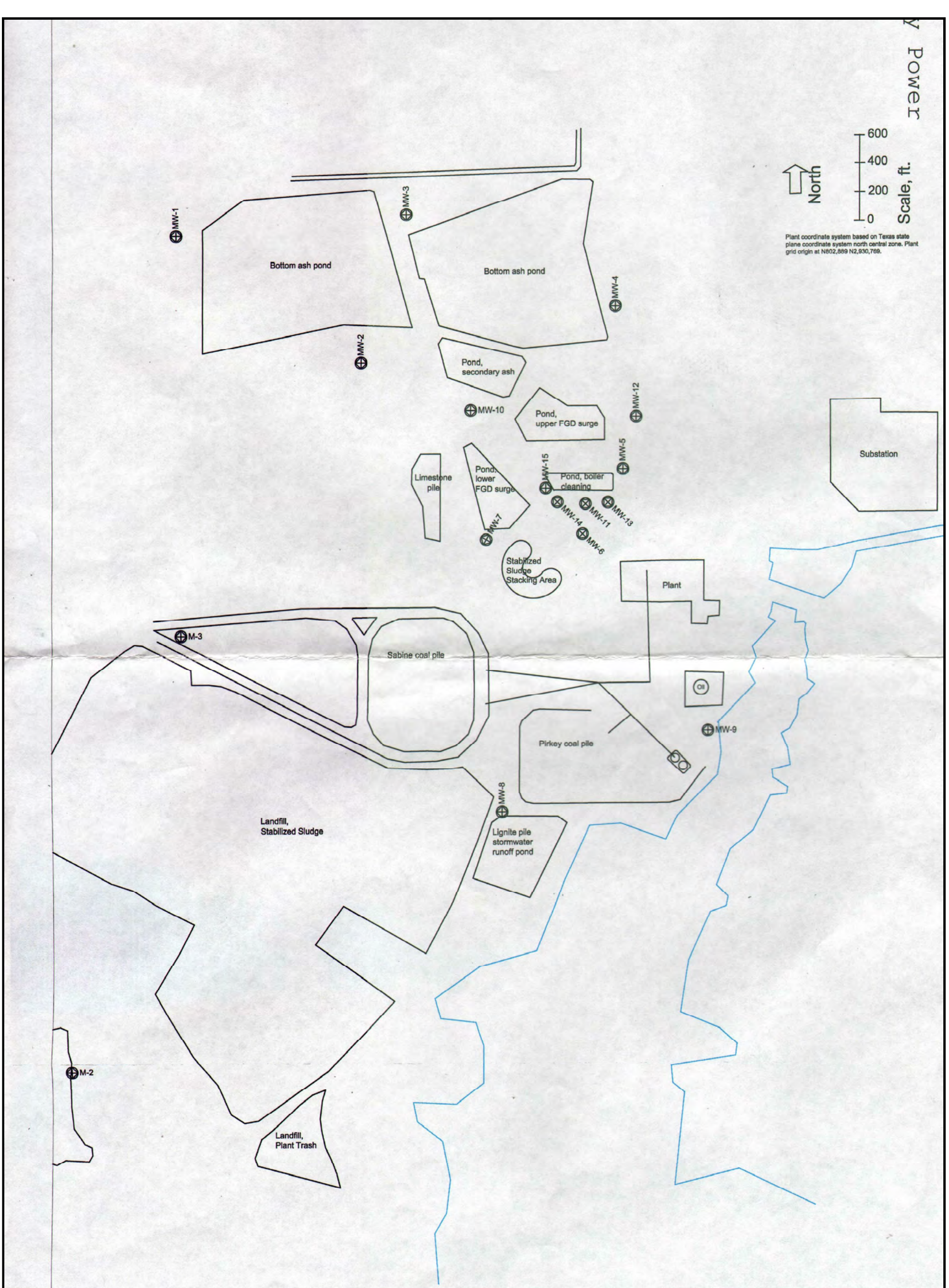
DWN BY:	CAE
CHK'D BY:	MOS
DATUM:	
PROJECTION:	
SCALE:	AS SHOWN

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
STABILITY ANALYSIS BORING AND CRITICAL CROSS SECTION LOCATIONS

DATE:	11/9/10
PROJECT NO:	3-2108-0183.0003
REV. NO.:	
FIGURE No.	9

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\September Round 8\Pirkey\Pirkey Photos and CAD files\cad\Stabanaborcritcrossloc.dwg – Layout1 – Nov. 17, 2010 10:59am – chris.eger



CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DWN BY: CAE CHK'D BY: XXX	PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	REV. NO.: DATE: 11/9/10
AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	DATUM: PROJECTION: SCALE: AS SHOWN	TITLE AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX MONITORING WELL LOCATION MAP	PROJECT NO: 3-2106-0183.0003 FIGURE No. 10

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\September Round 8\Pirkey\Pirkey Photos and CAD files\cad\moniroeingwelllocationmap.dwg – Layout2 – Nov. 17, 2010 10:55am – chris.eger

APPENDIX A
Waste Impoundment Inspection Forms

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: H.W. Pirkey	Date: October 19, 2010
Unit Name: West Bottom Ash Pond	Operator's Name: SWEPCO
Unit I.D.: ---	Hazard Potential Classification: High Significant **Low**[1]
Inspector's Name: Don Dotson/AMEC and Mary Sawitzki/AMEC	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	See note		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	Not provided		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Not provided		20. Decant Pipes: N/A, SEE NOTE		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	Not provided		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)? See note			Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	see	note	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
1.	SWEPCO conducts daily inspections (visual); AEP Geotechnical conducts annual inspections (written)
2.	Two (2) feet of freeboard is maintained on all ponds
6.	Piezometers and monitoring wells exist, but information was not provided regarding frequency of reading
8.	Unknown
20.	West Bottom Ash Pond is hydraulically connected to Secondary Ash Pond via valved, submerged pipe (diameter not provided), CCW is not decanted directly from West Bottom Ash Pond, pond levels appeared to be even at time of site visit.

[1] Changed from Significant (shown in original and Draft report submittals) due to clarified drainage path and direction information.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # TPDES-WQ0002496000 INSPECTOR Don Dotson/AMEC
Date October 19, 2010 Mary Sawitzki/AMEC

Impoundment Name West Bottom Ash Pond
Impoundment Company AEP/Southwester Electric Power Company (SWEPCO)
EPA Region 6
State Agency (Field Office) Address: Texas Commission of Environmental Quality (TCEQ)
12100 Park 35 Circle
Austin, TX 78753

Name of Impoundment H.W. Pirkey West Bottom Ash Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Receives bottom ash from coal combustion process

Nearest Downstream Town: Name Logansport, LA
Distance from the impoundment approximately 60 miles
Impoundment
Location: Longitude -94 Degrees 29 Minutes 30.2 Seconds
Latitude 32 Degrees 28 Minutes 2.5 Seconds
State TX County Harrison

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? Texas Commission on Environmental Quality (TCEQ)

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X[1]__**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

_____**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

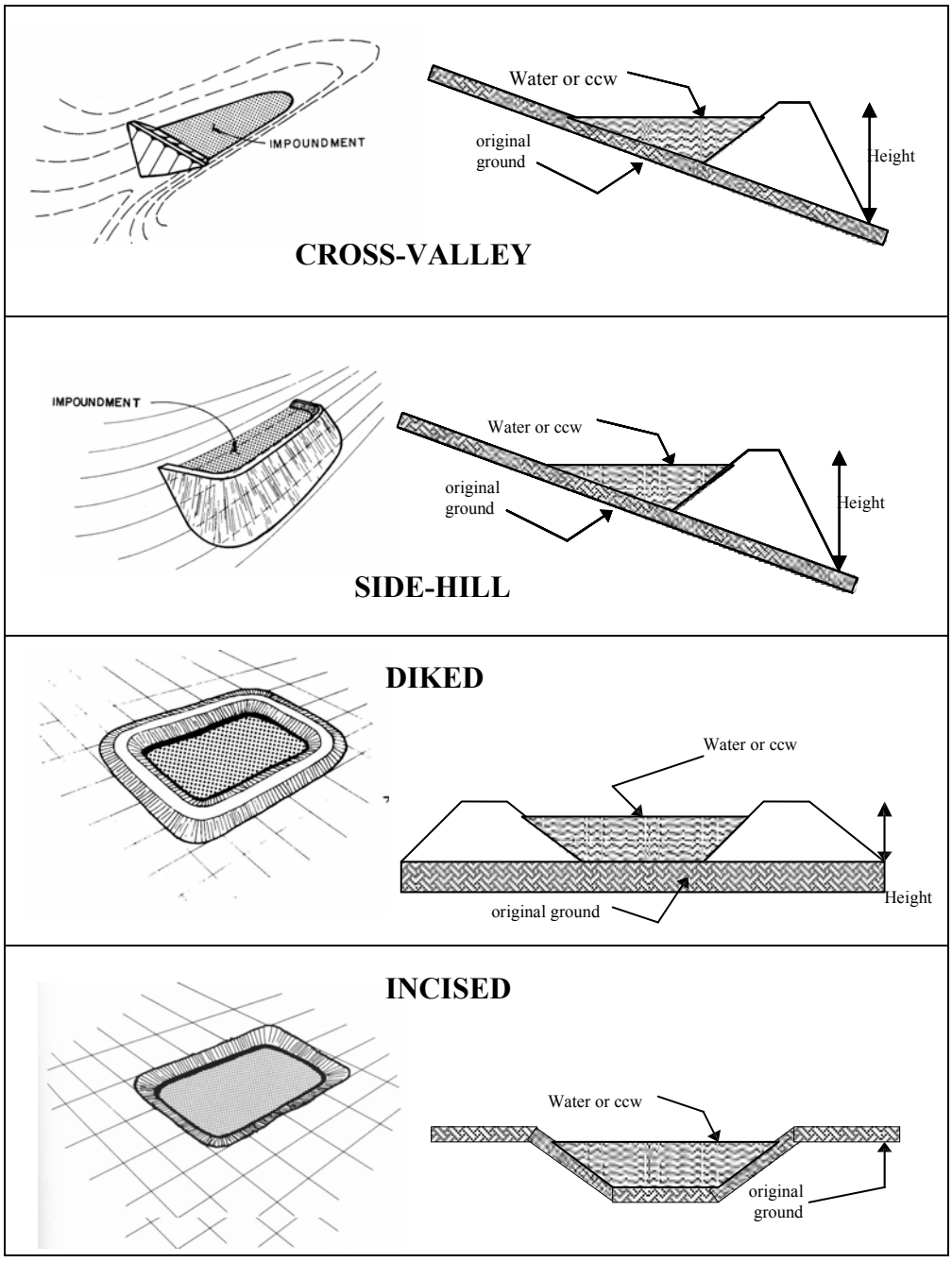
_____**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure or misoperation of the West Ash Pond would discharge contents via an unnamed tributary toward Hatley Creek, which is located over 5,000 feet away from the pond.

[1] Changed from Significant Hazard Rating in the Draft Report, due to discharge path clarification information provided in AEP comments to the November 2010 Draft Report.

CONFIGURATION:



_____Cross-Valley
_____Side-Hill
_____Diked (primarily)
_____Incised (form completion optional)
__X__Combination Incised/Diked (90% diked)

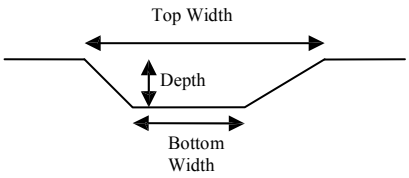
Embankment Height 25 feet Embankment Material unknown
Pool Area 30.85 acres Liner unknown
Current Freeboard 2 feet Liner Permeability unknown

TYPE OF OUTLET (Mark all that apply)

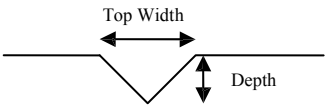
_____Open Channel Spillway
_____Trapezoidal
_____Triangular
_____Rectangular
_____Irregular

_____depth
_____bottom (or average) width
_____top width

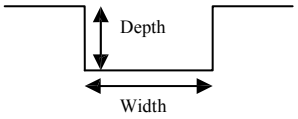
TRAPEZOIDAL



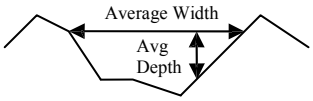
TRIANGULAR



RECTANGULAR

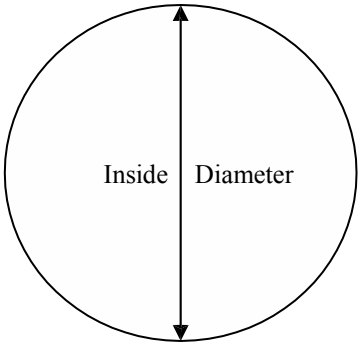


IRREGULAR



_____Outlet

36 inch[1] inside diameter
Reported on design drawing AEPPRK000150 (HP119) as 36" CMP



Material
X corrugated metal
_____welded steel
_____concrete
_____plastic (hdpe, pvc, etc.)
_____other (specify) _____
Connected hydraulically via valved pipe (36") to Secondary Ash Pond, water surface elevations in both ponds appeared to be approximately even.

Is water flowing through the outlet? YES _____ NO X

At time of site visit, Pirkey Facility was not discharging CCW.

_____No Outlet

_____Other Type of Outlet (specify) _____

The Impoundment was Designed By Sargent & Lundy

[1]Added pipe material and diameter information not included on November 2010 Draft Report checklist

Has there ever been a failure at this site? YES _____ NO _X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO X

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _X_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: H.W. Pirkey	Date: October 19, 2010
Unit Name: East Bottom Ash Pond	Operator's Name: SWEPCO
Unit I.D.: ---	Hazard Potential Classification: High Significant **Low**
Inspector's Name: Don Dotson/AMEC and Mary Sawitzki/AMEC	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	See note		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	Not provided		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Not provided		20. Decant Pipes: N/A, SEE NOTE		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	Not provided		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)? SEE NOTE			Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	see	note	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
1.	SWEPCO conducts daily inspections (visual); AEP Geotechnical conducts annual inspections (written)
2.	Two (2) feet of freeboard is maintained on all ponds
6.	Piezometers and monitoring wells exist, but information was not provided regarding frequency of reading
8.	Unknown
20.	Pond is hydraulically connected to Secondary Ash Pond via submerged pipe (diameter not provided), CCW is not decanted directly from pond, East Ash Pond was out of service for dredging at time of site visit.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # TPDES-WQ0002496000

INSPECTOR Don Dotson/AMEC
Mary Sawitzki/AMEC

Date October 19, 2010

Impoundment Name East Bottom Ash Pond
Impoundment Company AEP/Southwester Electric Power Company (SWEPCO)
EPA Region 6
State Agency (Field Office) Address: Texas Commission of Environmental Quality (TCEQ)
12100 Park 35 Circle
Austin, TX 78753

Name of Impoundment H.W. Pirkey East Bottom Ash Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Receives bottom ash from coal combustion process

Nearest Downstream Town: Name Logansport, LA
Distance from the impoundment approximately 60 miles
Impoundment
Location: Longitude -94 Degrees 29 Minutes 12.3 Seconds
Latitude 32 Degrees 28 Minutes 1.4 Seconds
State TX County Harrison

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? Texas Commission on Environmental Quality (TCEQ)

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

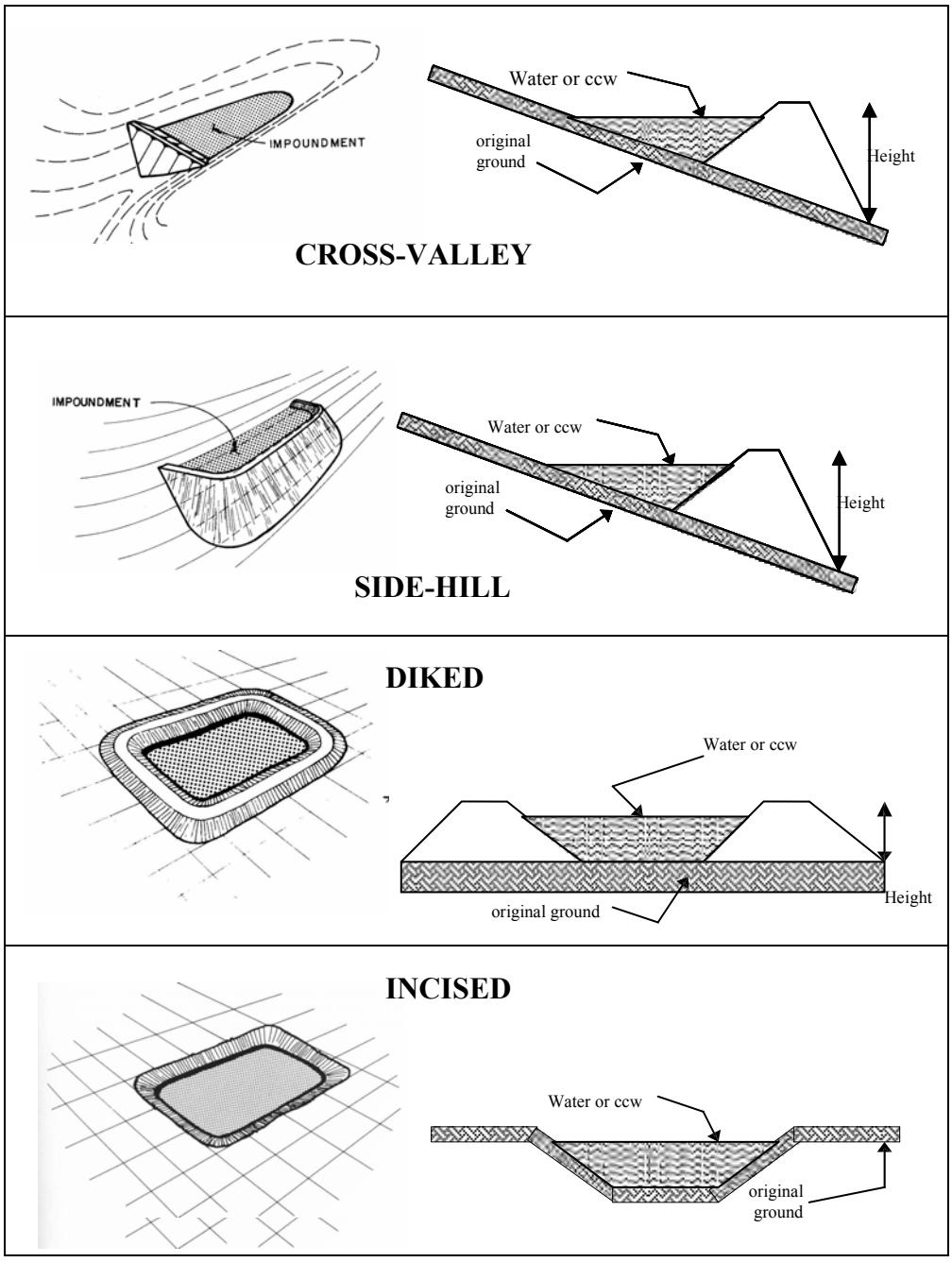
_____**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Embankment is 4 ft high, failure or misoperation would likely cause only low environmental impacts and low safety concern as there would not be much water/solids volume to escape above adjacent ground surface

CONFIGURATION:



_____Cross-Valley
_____Side-Hill
_____Diked (primarily)
_____Incised (form completion optional)
__X__Combination Incised/Diked (primarily diked)

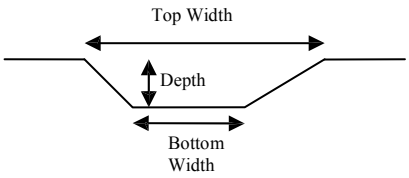
Embankment Height 4 feet Embankment Material unknown
Pool Area 30.85 acres Liner unknown
Current Freeboard 2 feet Liner Permeability unknown

TYPE OF OUTLET (Mark all that apply)

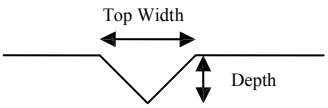
_____Open Channel Spillway
_____Trapezoidal
_____Triangular
_____Rectangular
_____Irregular

_____depth
_____bottom (or average) width
_____top width

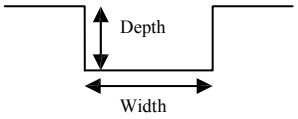
TRAPEZOIDAL



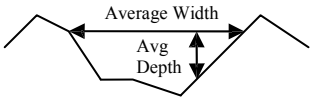
TRIANGULAR



RECTANGULAR

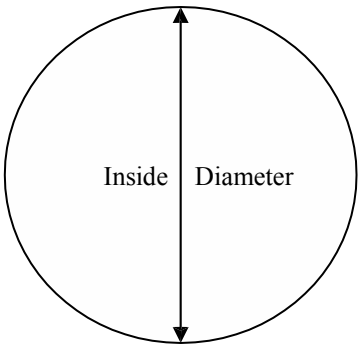


IRREGULAR



_____Outlet

_____inside diameter



Material
_____corrugated metal
_____welded steel
_____concrete
_____plastic (hdpe, pvc, etc.)
_____other (specify) _____

Is water flowing through the outlet? YES _____ NO X_____

At time of site visit, Pirkey Facility was not discharging CCW to pond, pond was dry and undergoing solids excavation .

_____No Outlet

X___Other Type of Outlet (specify) Connected hydraulically via valved pipe (unknown diameter) to Secondary Ash Pond.

The Impoundment was Designed By Sargent & Lundy

Has there ever been a failure at this site? YES _____ NO X

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO X

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _X_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: H.W. Pirkey	Date: October 19, 2010
Unit Name: Secondary Bottom Ash Pond	Operator's Name: SWEPCO
Unit I.D.: ---	Hazard Potential Classification: High Significant **Low**
Inspector's Name: Don Dotson/AMEC and Mary Sawitzki/AMEC	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	See note		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	353.8 feet		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Not provided		20. Decant Pipes: SEE NOTE		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	Not provided		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)? SEE NOTE			Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	see	note	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place? N/A			From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1. SWEPCO conducts daily inspections (visual); AEP Geotechnical conducts annual inspections (written)

2. Two (2) feet of freeboard is maintained on all ponds

6. Monitoring wells and piezometers exist, but no clear information provided on frequency of reading

8. Unknown

16 and 20. Secondary Ash Pond is hydraulically connected to West and East Bottom Ash Ponds via valved, submerged pipes (diameter not provided), decant is pumped directly from Secondary Bottom Ash Pond to facility for reuse or to TXPDES discharge ID 006, pond levels (Secondary and West Bottom Ash) appeared to be even at time of site visit, connecting pipe open. (East Ash Pond was dry and undergoing solids excavation at time of site visit).

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # TPDES-WQ0002496000__ INSPECTOR Don Dotson/AMEC
Date October 19, 2010 Mary Sawitzki/AMEC

Impoundment Name Secondary Bottom Ash Pond
Impoundment Company AEP/Southwester Electric Power Company (SWEPCO)
EPA Region 6
State Agency (Field Office) Address: Texas Commission of Environmental Quality (TCEQ)
12100 Park 35 Circle
Austin, TX 78753

Name of Impoundment Pirkey Secondary Bottom Ash Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	X*	_____

*Receives gravity (not pumped) flow from Bottom Ash Ponds

IMPOUNDMENT FUNCTION: Equalization, receives flow from Bottom Ash Ponds, source for facility reuse water, and location of TXPDES dishcharge point

Nearest Downstream Town: Name Logansport, LA
Distance from the impoundment 60 miles
Impoundment
Location: Longitude -94 Degrees 29 Minutes 15.8 Seconds
Latitude 32 Degrees 27 Minutes 55.4 Seconds
State TX County Harrison

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? Texas Commission on Environmental Quality (TCEQ)

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

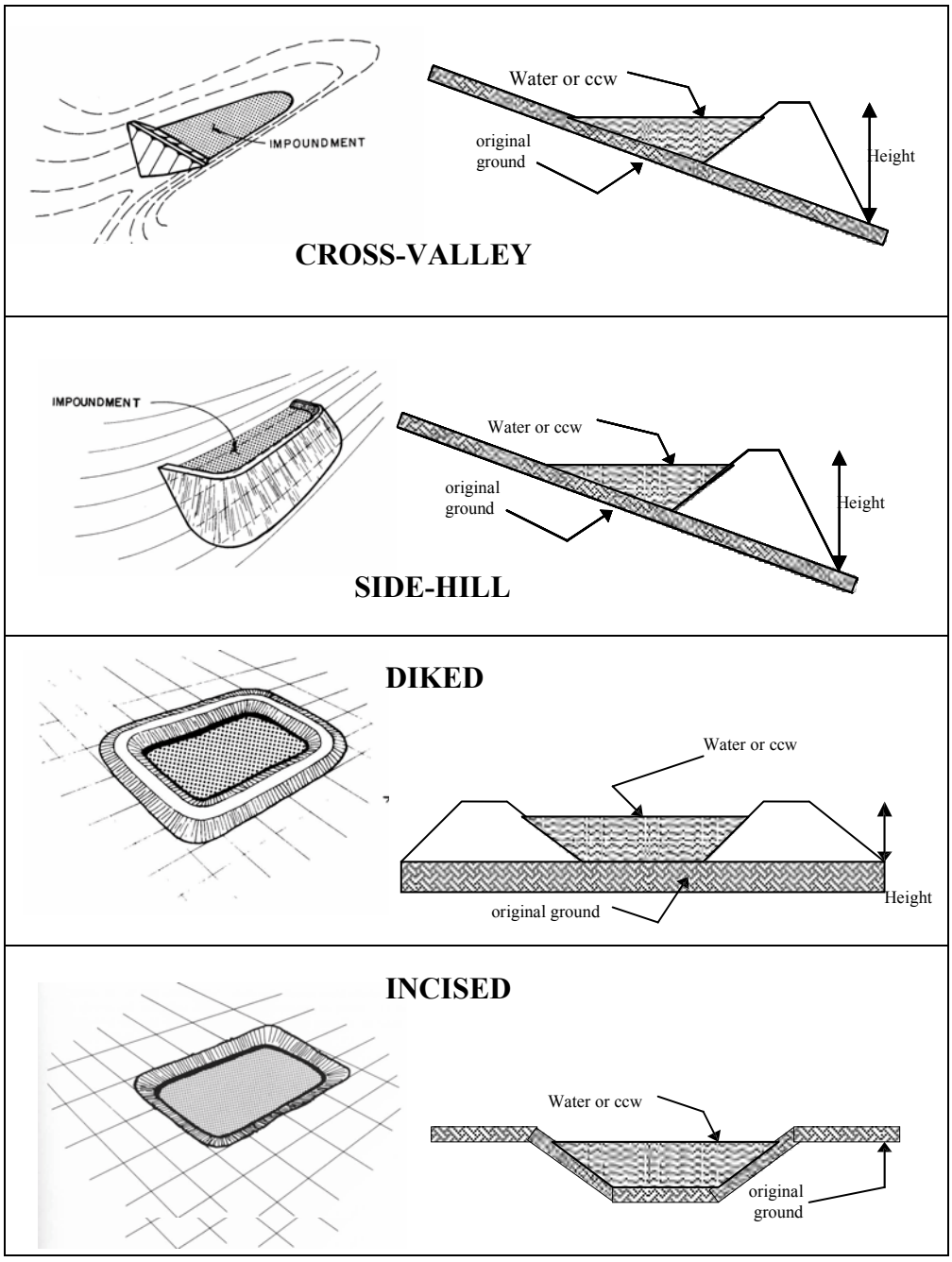
_____**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Pond is almost entirely incised

CONFIGURATION:



_____Cross-Valley
_____Side-Hill
_____Diked (small section on southwest corner)
_____Incised (form completion optional)
__X__Combination Incised/Diked (primarily incised, small area on SW corner diked)

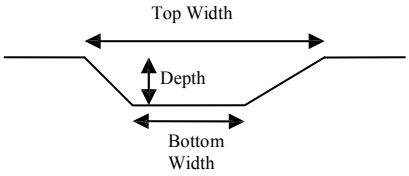
Embankment Height __0_____feet Embankment Material unknown
Pool Area _____2.65_____ acres Liner unknown
Current Freeboard ___2_____ feet Liner Permeability unknown

TYPE OF OUTLET (Mark all that apply)

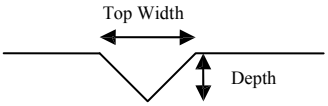
_____Open Channel Spillway
_____Trapezoidal
_____Triangular
_____Rectangular
_____Irregular

_____depth
_____bottom (or average) width
_____top width

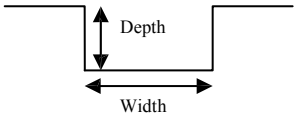
TRAPEZOIDAL



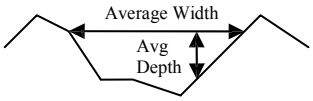
TRIANGULAR



RECTANGULAR

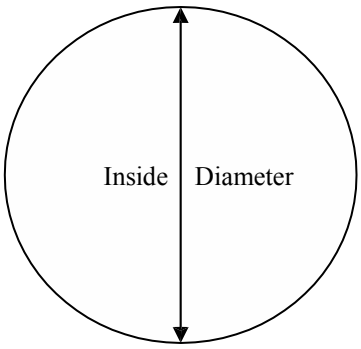


IRREGULAR



_____Outlet

_____inside diameter



Material
_____corrugated metal
_____welded steel
_____concrete
_____plastic (hdpe, pvc, etc.)
_____other (specify) _____

Is water flowing through the outlet? YES _____ NO X_____

At time of site visit, Pirkey Facility was not discharging from Secondary Ash Pond

_____No Outlet

X ___Other Type of Outlet (specify) discharged via pump, not gravity

The Impoundment was Designed By Sargent & Lundy

Has there ever been a failure at this site? YES _____ NO _X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO X

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _X_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: H.W. Pirkey	Date: October 19, 2010
Unit Name: Surge Pond	Operator's Name: SWEPCO
Unit I.D.: ---	Hazard Potential Classification: High Significant **Low**
Inspector's Name: Don Dotson/AMEC and Mary Sawitzki/AMEC	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	See note		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	355.4 feet		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Not provided		20. Decant Pipes: N/A, SEE NOTE		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	Not provided		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)? See note			Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)	N/A		At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?	N/A	
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	N/A	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
1.	SWEPCO conducts daily inspections (visual); AEP Geotechnical conducts annual inspections (written)
2.	Per operators: two (2) feet of freeboard is maintained on all ponds
6.	Monitoring wells exist, but no clear information provided on frequency of reading
8.	N/A – pond is incised
20.	Water discharges from surge pond via pump, either reused at facility or directed to TXPDES outfall

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # TPDES-WQ0002496000_ INSPECTOR Don Dotson/AMEC
Date October 19, 2010 Mary Sawitzki/AMEC

Impoundment Name Surge Pond
Impoundment Company AEP/Southwester Electric Power Company (SWEPCO)
EPA Region 6
State Agency (Field Office) Address: Texas Commission of Environmental Quality (TCEQ)
12100 Park 35 Circle
Austin, TX 78753

Name of Impoundment Pirkey Surge Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	X*	_____

*Water is entering pond, whether by pump or gravity flow is unknown.

IMPOUNDMENT FUNCTION: Receives discharge from flue gas desulfurization process

Nearest Downstream Town: Name Logansport, LA
Distance from the impoundment 60 miles
Impoundment Location: Longitude -94 Degrees 29 Minutes 14.7 Seconds
Latitude 32 Degrees 27 Minutes 46.7 Seconds
State TX County Harrison

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency?_____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

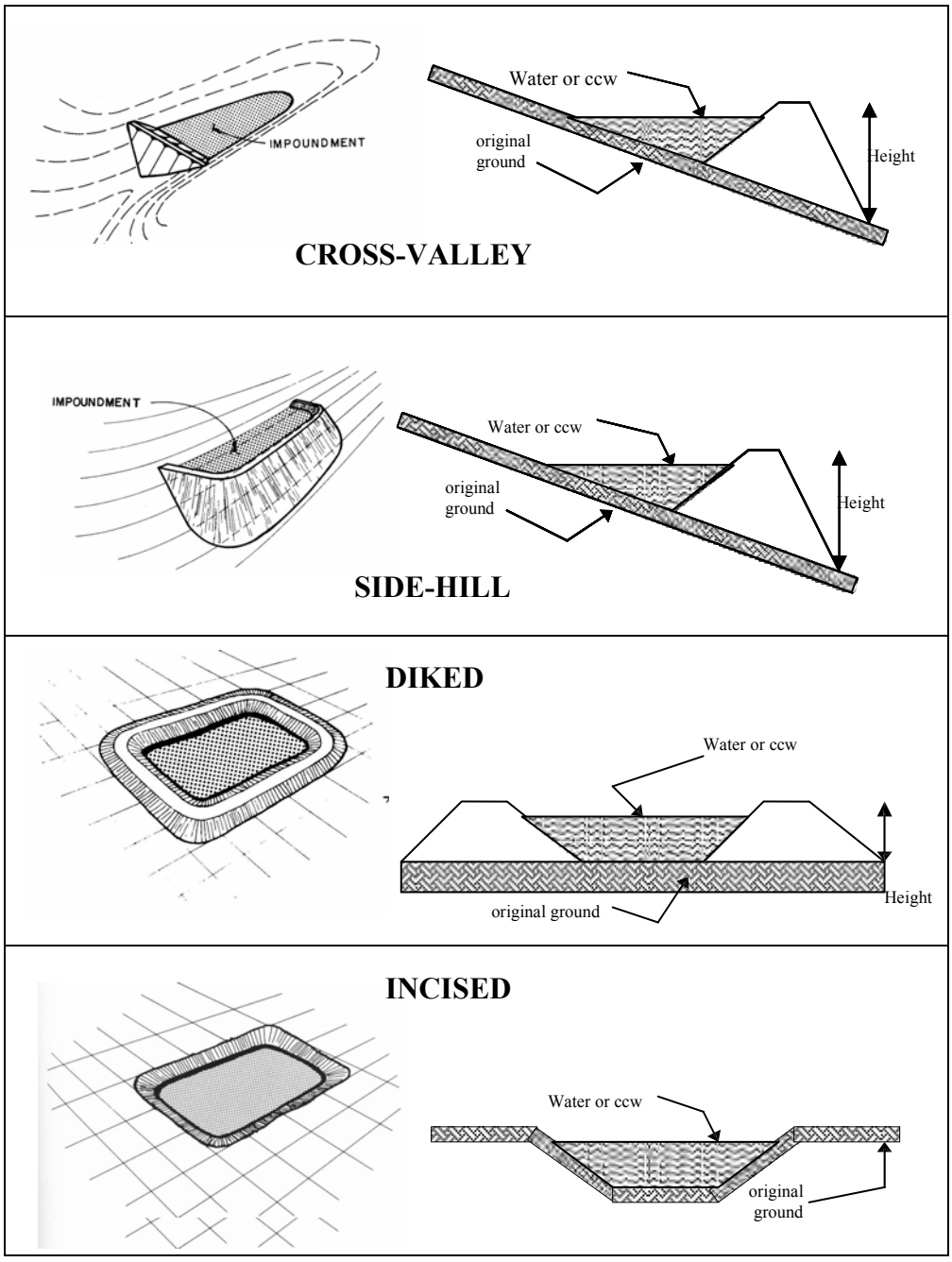
_____**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Surge pond is incised, limited chance of failure

CONFIGURATION:



_____Cross-Valley
_____Side-Hill
_____Diked
_X_Incised (form completion optional)
_____Combination Incised/Diked

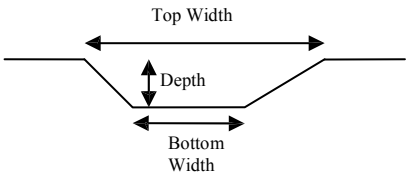
Embankment Height 0 feet Embankment Material N/A
Pool Area 4.7 acres Liner unknown
Current Freeboard 2 feet Liner Permeability unknown

TYPE OF OUTLET (Mark all that apply)

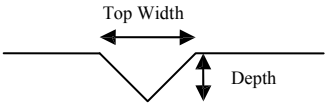
_____Open Channel Spillway
_____Trapezoidal
_____Triangular
_____Rectangular
_____Irregular

_____depth
_____bottom (or average) width
_____top width

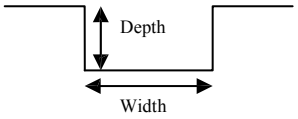
TRAPEZOIDAL



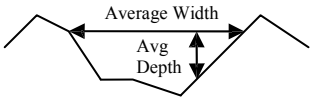
TRIANGULAR



RECTANGULAR

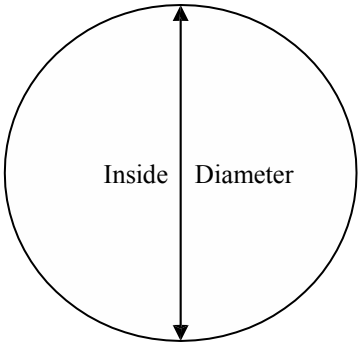


IRREGULAR



_____Outlet

_____inside diameter



Material
_____corrugated metal
_____welded steel
_____concrete
_____plastic (hdpe, pvc, etc.)
_____other (specify) _____

Is water flowing through the outlet? YES _____ NO X_____

At time of site visit, Pirkey Facility was not discharging CCW.

_____No Outlet

X ___Other Type of Outlet (specify) Discharge via pump for facility reuse[1]

The Impoundment was Designed By Sargent & Lundy

[1] Removed reference to TPDES outfall included in November 2010 Draft Report, no TPDES outfall exists for this pond.

Has there ever been a failure at this site? YES _____ NO _X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO X

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _X_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: H.W. Pirkey	Date: October 19, 2010
Unit Name: Auxiliary Surge Pond	Operator's Name: SWEPCO
Unit I.D.: ---	Hazard Potential Classification: High Significant **Low**
Inspector's Name: Don Dotson/AMEC and Mary Sawitzki/AMEC	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	See note		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	Dry		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Not provided		20. Decant Pipes: N/A, see note for 20, 21, and 22.		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	Not provided		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)? See note			Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below): NOTE		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	SEE	NOTE	From underdrain?		
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		
11. Is there significant settlement along the crest?		X	Over widespread areas?		
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		
16. Are outlets of decant or underdrains blocked?	N/A		23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
1.	SWEPCO conducts daily inspections (visual); AEP Geotechnical conducts annual inspections (written)
2.	Per operators: two (2) feet of freeboard is maintained on all ponds
6.	Piezometers and monitoring wells exist, but information was not provided regarding frequency of reading
8.	No information provided
20., 21., and 22.	Pond does not contain decant equipment, pipe or spillway, pond was dry during site visit

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # TPDES-WQ0002496000__ INSPECTOR Don Dotson/AMEC
Date October 19, 2010 Mary Sawitzki/AMEC

Impoundment Name Auxiliary Surge Pond
Impoundment Company AEP/Southwester Electric Power Company (SWEPCO)
EPA Region 6
State Agency (Field Office) Address: Texas Commission of Environmental Quality (TCEQ)
12100 Park 35 Circle
Austin, TX 78753

Name of Impoundment Pirkey Auxiliary Surge Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X*

*Pond was dry during site visit, per operators, due to excessively dry summer and fall weather.

IMPOUNDMENT FUNCTION: Receives discharge (flue gas desulfurization process) from Surge Pond when volume is too high for single pond

Nearest Downstream Town: Name Logansport, LA
Distance from the impoundment 60 miles
Impoundment Location: Longitude -94 Degrees 29 Minutes 8.9 Seconds
Latitude 32 Degrees 27 Minutes 52.1 Seconds
State TX County Harrison

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency?_____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

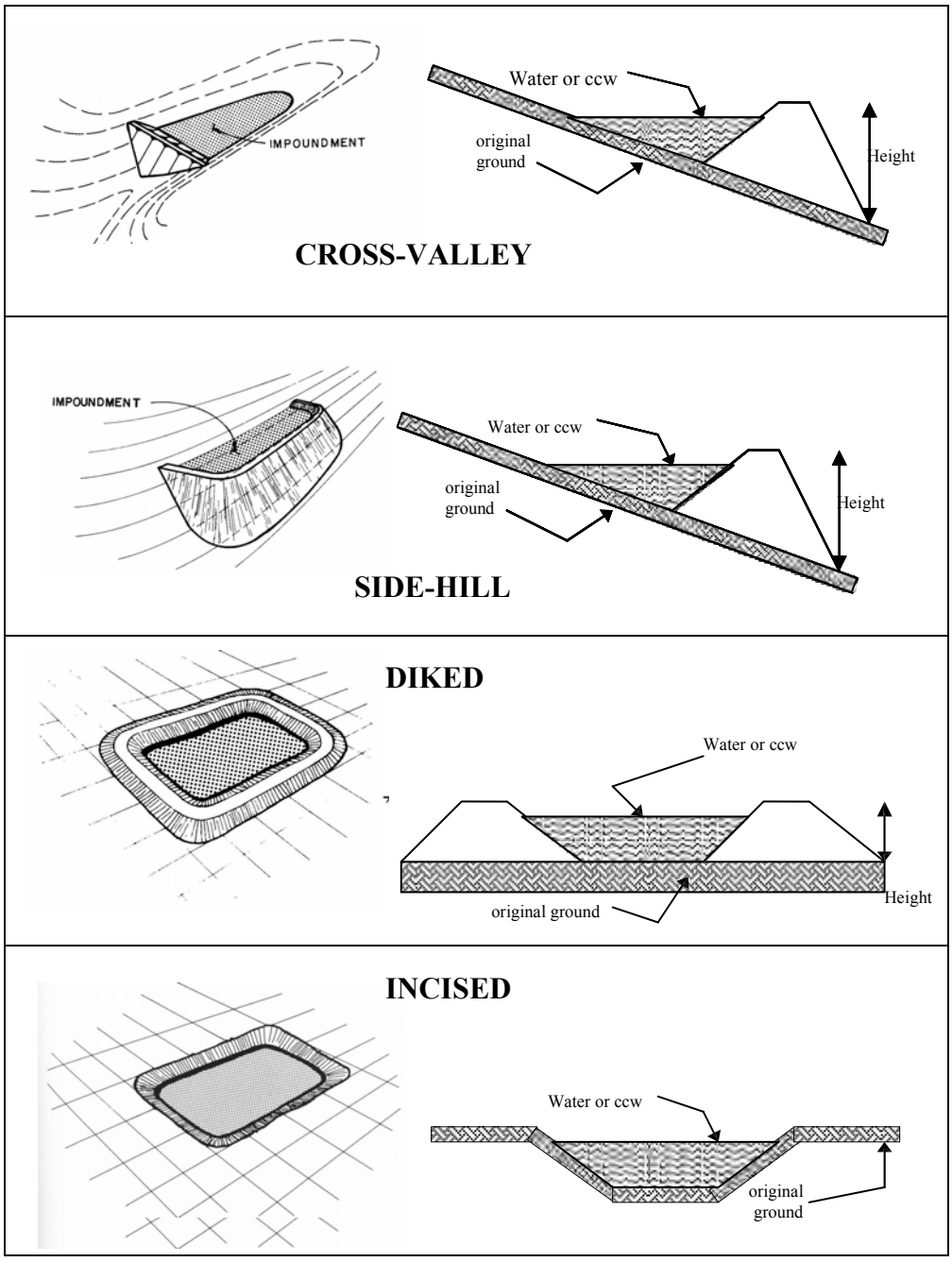
_____**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Losses primarily limited to owner's property.

CONFIGURATION:



_____Cross-Valley
__X__Side-Hill
_____Diked
_____Incised (form completion optional)
_____Combination Incised/Diked

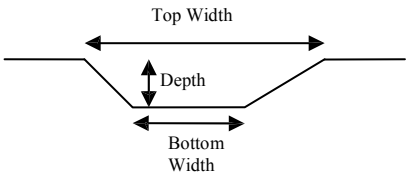
Embankment Height __15.9____ feet Embankment Material N/A
Pool Area 4.3 acres Liner unknown
Current Freeboard dry feet Liner Permeability unknown

TYPE OF OUTLET (Mark all that apply)

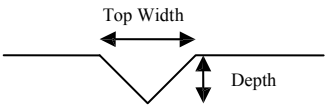
_____Open Channel Spillway
_____Trapezoidal
_____Triangular
_____Rectangular
_____Irregular

_____depth
_____bottom (or average) width
_____top width

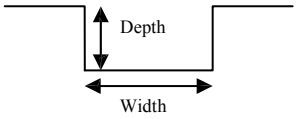
TRAPEZOIDAL



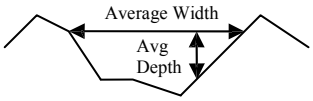
TRIANGULAR



RECTANGULAR

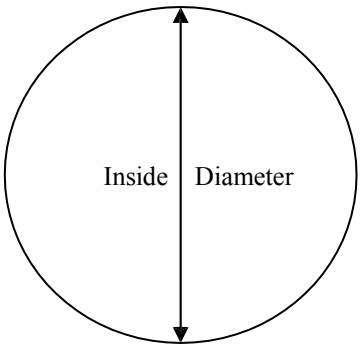


IRREGULAR



_____Outlet

_____inside diameter



Material
_____corrugated metal
_____welded steel
_____concrete
_____plastic (hdpe, pvc, etc.)
_____other (specify) _____

Is water flowing through the outlet? YES _____ NO X_____

At time of site visit, Pirkey Facility was not discharging CCW.

__X__No Outlet

_____Other Type of Outlet (specify) _____

The Impoundment was Designed By __AEP/SWEPCO Engineering_____

_____

Has there ever been a failure at this site? YES _____ NO X

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO X

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _X_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: H.W. Pirkey	Date: October 19, 2010
Unit Name: Scrubber Sludge Landfill	Operator's Name: SWEPCO
Unit I.D.: --- Storm Water Runoff Pond	Hazard Potential Classification: High Significant **Low**
Inspector's Name: Don Dotson/AMEC and Mary Sawitzki/AMEC	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	See note		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	Not provided		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Not provided		20. Decant Pipes: N/A, see note		
4. Open channel spillway elevation (operator records)?	Not provided		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	Not provided		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)? Yes, see note note			Is water exiting outlet flowing clear?		No flow
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	see	note	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place? N/A			From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
1.	SWEPCO conducts daily inspections (visual); AEP Geotechnical conducts annual inspections (written)
2.	Per operators: two (2) feet of freeboard is maintained on all ponds
6.	Monitoring wells are sampled semi-annually, piezometers sampling schedule is unknown[1]
8.	Unknown
16.	Did not appear to be[1]
20.	~~Decant pipe controlled by gate valve, also emergency spillway present~~[1]

[1] Corrected forms from those originally submitted as well as those in November 2010 Draft Report

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # TPDES WQ0002496000 INSPECTOR Don Dotson/AMEC
Date October 19, 2010 Mary Sawitzki/AMEC

Impoundment Name Scrubber Sludge Landfill Stormwater Runoff Pond
Impoundment Company AEP/Southwester Electric Power Company (SWEPCO)
EPA Region 6
State Agency (Field Office) Address: Texas Commission of Environmental Quality (TCEQ)
12100 Park 35 Circle
Austin, TX 78753

Name of Impoundment H.W. Pirkey Scrubber Sludge Landfill Storm Water Runoff Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment? Stormwater runoff from the landfill does enter the pond via gravity flow with each rainfall event	X	

IMPOUNDMENT FUNCTION: Contains stormwater runoff and any leachate from the facility's Scrubber Sludge Landfill

Nearest Downstream Town: Name Logansport, LA
Distance from the impoundment 60 miles
Impoundment
Location: Longitude -94 Degrees 29 Minutes 54.4 Seconds
Latitude 32 Degrees 27 Minutes 4.9 Seconds
State TX County Harrison

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? TCEQ (Solid Waste permit)

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

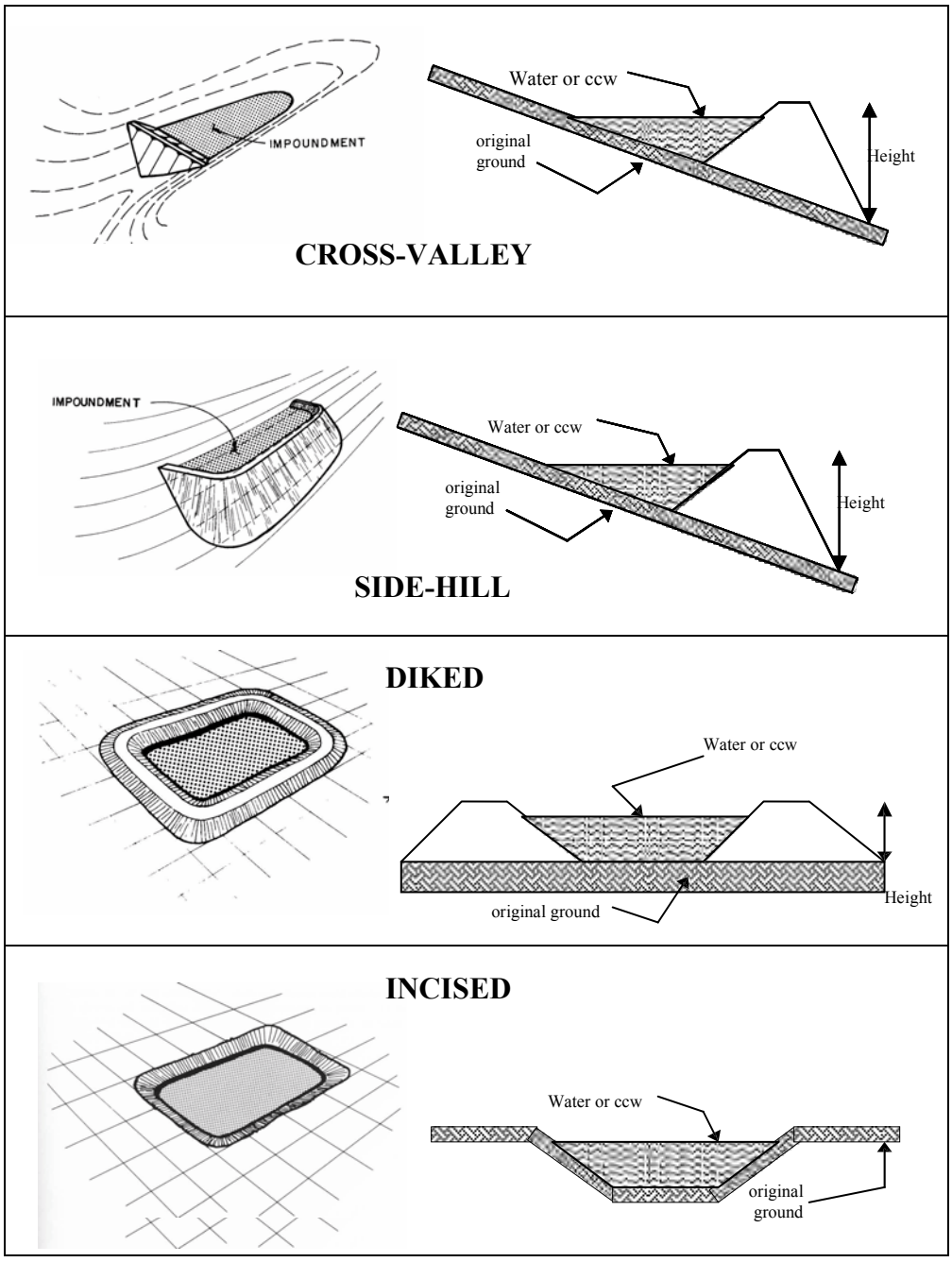
_____**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Low environmental impact to small downstream creek, settled impounded water has low solids content, would impact primarily owner's property

CONFIGURATION:



__X__ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

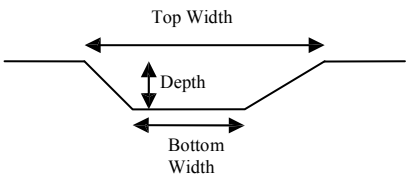
Embankment Height 19 feet Embankment Material unknown
Pool Area 12.88 acres Liner unknown
Current Freeboard 2 feet Liner Permeability unknown

TYPE OF OUTLET (Mark all that apply)

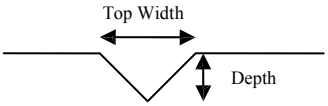
_____Open Channel Spillway
__X__Trapezoidal (emergency)
_____Triangular
_____Rectangular
_____Irregular

_____depth
~ 20 ft bottom (or average) width
~ 45 ft top width

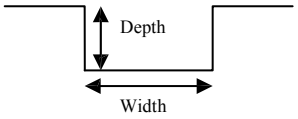
TRAPEZOIDAL



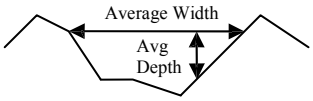
TRIANGULAR



RECTANGULAR

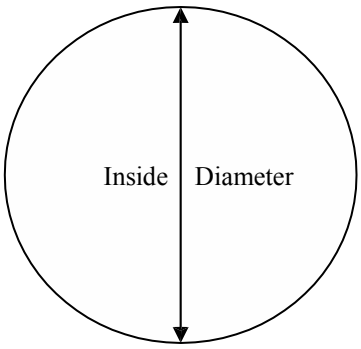


IRREGULAR



_____Outlet

_____inside diameter



Material
_____corrugated metal
_____welded steel
_____concrete
_____plastic (hdpe, pvc, etc.)
_____other (specify) _____

Is water flowing through the outlet? YES _____ NO __X__

_____No Outlet

__X__Other Type of Outlet (specify) discharge pipe and gate valve-diameter approx. 16-inch[1]

[1] updated from originally submitted forms and those included with November 2010 Draft Report

The Impoundment was Designed By internal – AEP/SWEPCO

Has there ever been a failure at this site? YES _____ NO _X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO X

If So When? _____

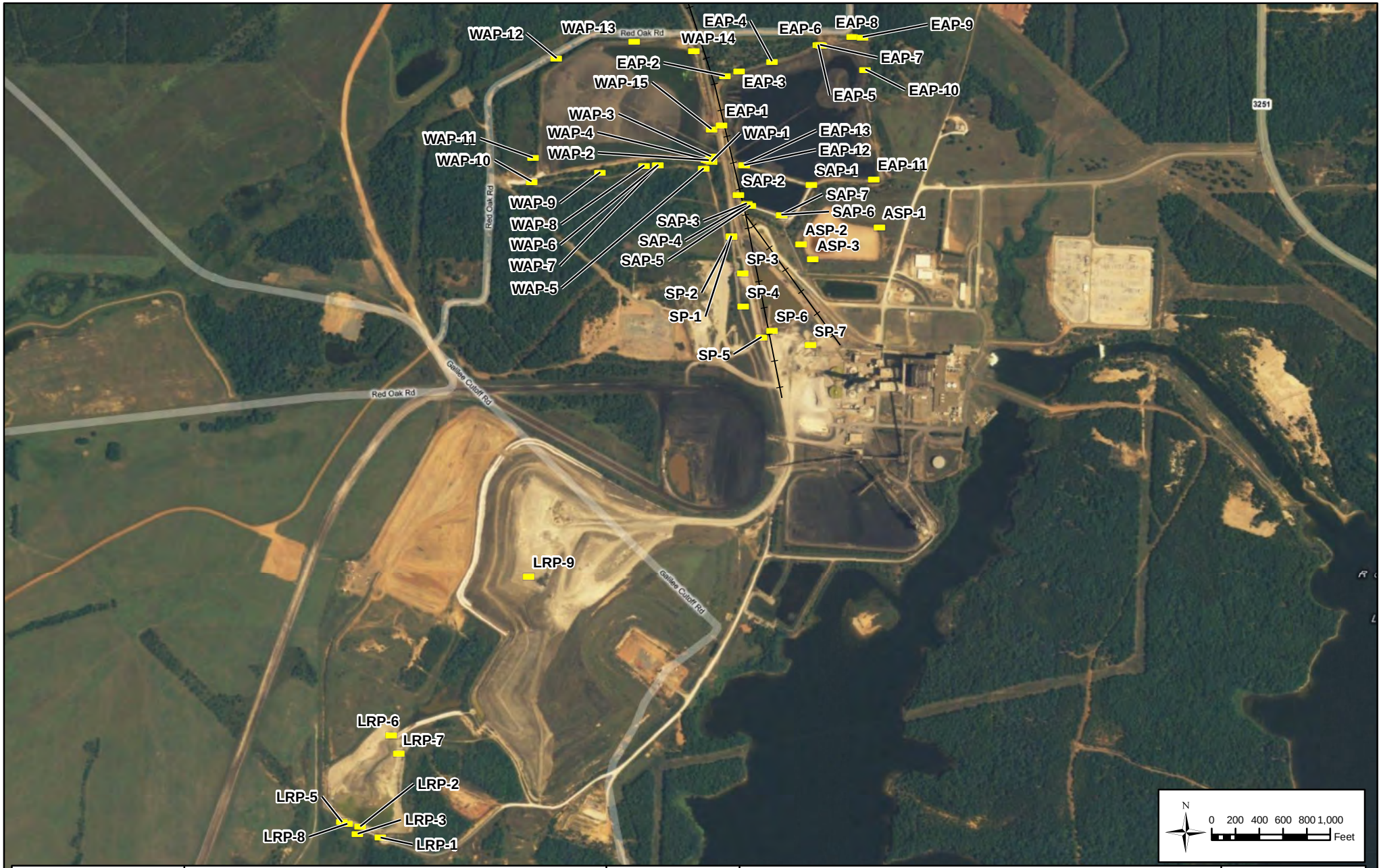
IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO _X_____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

APPENDIX B
Site Photo Log Map and Site Photos



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

AMEC Earth & Environmental
690 Commonwealth Business Center
11003 Bluegrass Parkway
Louisville, KY 40299

DWN BY: DJC
CKD BY: MS
Datum: NAD 83
Projection: UTM 15
Scale: As Shown

ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

AMERICAN ELECTRIC POWER (AEP) AND SOUTHWEST ELECTRIC POWER COMPANY (SWEPCO)
H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
PHOTO LOCATION MAP

REV. No.: A
Date: 11-9-10
Project No: 3-2106-0183-0003
Figure No: B-1

WAP-1
CREST AT SOUTHEAST CORNER CREST LOOKING WEST

WAP-2
TOP OF DISCHARGE STRUCTURE

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX WEST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-2

WAP-3
DISCHARGE PIPE VALVE OPERATOR

WAP-4
UPSTREAM SLOPE AT SOUTHEAST CORNER LOOKING WEST

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX WEST ASH POND SITE PHOTO

DWN BY: CAE	DATUM:	DATE: 11/8/10	
CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003	
PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-3	

WAP-5
LOOKING NORTH UP DOWNSTREAM SLOPE AT SOUTHEAST CORNER

WAP-6
LOOKING EAST ON SOUTH DOWNSTREAM EMBANKMENT

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
WEST ASH POND SITE PHOTO

DWN BY:	DATUM:	DATE:
CAE		11/8/10
CHK'D BY:	REV. NO.:	PROJECT NO:
MOS		3-2106-0183.0003
PROJECTION:	SCALE:	APPENDIX:
	AS SHOWN	B-4

WAP-7
STUMP ON SOUTH EMBANKMENT

WAP-8
RUTS AND STUMP ON SOUTH EMBANKMENT

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX WEST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-5

WAP-9
ANIMAL BURROW ON SOUTH DOWNSTREAM EMBANKMENT

WAP-10
SURFACE EROSION AT SOUTHWEST EMBANKMENT CORNER

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
WEST ASH POND SITE PHOTO

DWN BY: CAE	DATUM:	DATE: 11/8/10	
CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003	
PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-6	

WAP-11

LOOKING NORTH ALONG WESTERN DOWNSTREAM EMBANKMENT AT RECENT SURFACE WORK

WAP-12

LOOKING NORTHEAST ALONG NORTHERN DOWNSTREAM EMBANKMENT AT RECENT SURFACE WORK

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX WEST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-7

WAP-13
LOOKING WEST FROM CREST OF NORTHERN EMBANKMENT

WAP-14
LOOKING SOUTH FROM CREST OF EASTERN EMBANKMENT

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
WEST ASH POND SITE PHOTO

DWN BY:	DATUM:	DATE:
CAE		11/8/10
CHK'D BY:	REV. NO.:	PROJECT NO:
MOS		3-2106-0183.0003
PROJECTION:	SCALE:	APPENDIX:
	AS SHOWN	B-8

WAP-15
LOOKING SOUTH AT INFLUENT PIPE-NEUTRALIZED WASTE FROM DEMINERALIZER

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX WEST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-9

EAP-1
LOOKING EAST ACROSS POND FROM WESTERN CREST

EAP-2
LOOKING NORTHEAST FROM
CREST OF NORTHERN EMBANKMENT

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX
EAST ASH POND SITE PHOTO

DWN BY: CAE	DATUM:	DATE: 11/8/10	
CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003	
PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-10	

EAP-3
PIEZOMETER ON CREST OF NORTHERN EMBANKMENT

EAP-4
LOOKING NORTH FROM NORTHERN EMBANKMENT AT HIGHER GROUND

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX EAST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-11

EAP-5
LOOKING SOUTH FROM NORTHERN EMBANKMENT

EAP-6
LOOKING SOUTHWEST FROM NORTHERN EMBANKMENT AT STACKED ASH

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX EAST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-12

EAP-7
GATE TO ROAD NORTH OF NORTHERN EMBANKMENT

EAP-8
WATER LINE ON NORTHEAST CORNER OF POND

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX EAST ASH POND SITE PHOTO		CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
		PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-13

EAP-9
GAS PIPE LINE MARKER AT NORTHEAST CORNER OF POND

EAP-10
LOOKING SOUTH FROM EASTERN CREST AT ASH STACK AND HIGHER GROUND TO EAST

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX EAST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-14

EAP-11
LOOKING WEST FROM SOUTHEAST CORNER CREST

EAP-12
LOOKING NORTHEAST FROM SOUTHWEST CORNER ACROSS DISCHARGE STRUCTURE

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX EAST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-15

EAP-13
SOUTHWEST CREST LOOKING NORTHWEST
PAST DUST CONTROL LOAD OUT PIPE

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX EAST ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-16

SAP-1
LOOKING WEST ACROSS POND FROM NORTHEAST CORNER

SAP-2
INFLUENT OF BOILER BLOWDOWN
DISCHARGE PIPE AT SOUTHWEST CORNER

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SECONDARY ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-17

SAP-3
NPDES DISCHARGE OUTFALL 006 AT SOUTHWEST CORNER

SAP-4
TRANSFER PIPE CARRYING REUSE
FLOW TO ADJADENT LIGNITE MINE

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SECONDARY ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-18

SAP-5
PIEZOMETER AT SOUTHWEST CORNER

SAP-6
FROM SOUTHEAST CORNER LOOKING NORTHWEST AT MARKER INDICATING LOCATION OF PLANT REUSE PIPE

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SECONDARY ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-19

SAP-7

REUSE PUMP HOUSE ON SOUTH SHORE OF POND

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SECONDARY ASH POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-20

SP-1

RAILROAD TRACKS WEST OF SURGE POND-FROM NORTHERN CORNER LOOKING SOUTHEAST

SP-2

NORTHWEST OF POND LOOKING SOUTH AT LIMESTONE UNLOADING AREA

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SURGE POND SITE PHOTO

DWN BY: CAE	DATUM:	DATE: 11/8/10	
CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003	
PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-21	

SP-3

WEST OF SURGE POND LOOKING NORTHWEST
AT LIMESTONE UNLOADING AREA

SP-4

STORM WATER CULVERT (18-INCH) THROUGH
EMBANKMENT SOUTH OF LIMESTONE UNLOADER

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SURGE POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-22

SP-5

MONITORING WELL LOCATED ADJACENT
TO SOUTHWEST CORNER OF POND

SP-6

LOOKING NORTH SOUTH EDGE OF POND
AT FACILTIY REUSE PUMP STATION

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SURGE POND SITE PHOTO		CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
		PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-23

SP-7

SOUTHEAST CORNER OF POND LOOKING AT FLOWING FLUE GAS DESULFURIZATION PROCESS INFLUENT PIPE (18-INCH)

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SURGE POND SITE PHOTO

DWN BY: CAE	DATUM:	DATE: 11/8/10	
CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003	
PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-24	

ASP-1
LOOKING WEST FROM NORTHEAST
CORNER EMBANKMENT

ASP-2
LOOKING EAST ACROSS POND
FROM WESTERN EMBANKMENT

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SURGE POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-25

ASP-3
PIEZOMETER ON SOUTHWEST
CORNER OF POND EMBANKMENT

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY		
PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX SURGE POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-26

LRP-1
LOOKING NORTH ACROSS POND FROM
SOUTHEASTERN EMBANKMENT CREST

LRP-2
POND DISCHARGE STRUCTURE-NPDES OUTFALL 004

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX LANDFILL RUNOFF POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-27

LRP-3
DOWNSTREAM DISCHARGE-NPDES OUTFALL 004

LRP-4
LANDFILL UNDERDRAIN DISCHARGE POINT ON DOWNSTREAM SIDE OF EMBANKMENT ADJACENT TO NPDES OUTFALL 004

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX LANDFILL RUNOFF POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-28

LRP-5
PIEZOMETER ON EMBANKMENT CREST

LRP-6
LOOKING EAST AT DOWNSTREAM DISCHARGE OF 60 ML HDPE LINED LANDFILL RUNOFF/LEACHATE CHANNEL

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX LANDFILL RUNOFF POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-29

LRP-7
MONITORING WELL ADJACENT TO
NORTHEASTERN CORNER OF POND

LRP-8
LOOKING WEST FROM CREST AT
UNLINED EARTHEN EMERGENCY SPILLWAY

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 11/8/10
TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX LANDFILL RUNOFF POND SITE PHOTO	CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003
	PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-30

LRP-9

ATOP LANDFILL LOOKING SOUTHWEST AT LANDFILL PERIMETER CHANNEL AND LANDFILL RUNOFF POND

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: AMERICAN ELECTRIC POWER (AEP) AND SOUTHWESTLECTRIC POWER COMPANY (SWEPCO) H.W. PIRKEY POWER PLANT, HALLSVILLE, TX LANDFILL RUNOFF POND SITE PHOTO

DWN BY: CAE	DATUM:	DATE: 11/8/10	
CHK'D BY: MOS	REV. NO.:	PROJECT NO: 3-2106-0183.0003	
PROJECTION:	SCALE: AS SHOWN	APPENDIX: B-31	

APPENDIX C
Inventory of Provided Materials

DOCUMENT TITLE/DESCRIPTION	ORIGINAL DOCUMENT NAME	(CD) SCANNED FILE NUMBER
PIRKEY POWER PLANT		
ETTL Final Slope Stability Report 3241-09 Revision 3	ETTL Final Slope Stability Report 3241-09 rev03.pdf	AEPPRK000001.pdf
Sludge Disposal Area Expansion Plan, Site Work Plan	HP-69-20.tif	AEPPRK000149.pdf
Sludge Disposal Area Expansion Plan, Basin #2 Plan and Details	HP-69-21.tif	AEPPRK000150.pdf
North Surge Pond, Unit 1	HP-91-2.TIF	AEPPRK000151.pdf
SPCC & Storm Water Site Plan	HP-134prevhp-104.TIF	AEPPRK000152.pdf
Landfill Pond Design Rainfall Event Report	Landfill Pond Design Rainfall event.pdf	AEPPRK000153.pdf
Landfill Pond Volume Calculations	Landfill Pond Volume Calculations.pdf	AEPPRK000157.pdf
Southwestern Laboratories Liner Verification S Borings	Liner Verification S Borings 10 11 1984.pdf	AEPPRK000162.pdf
Monitoring Wells with 2009 Aerial	Monitoring Wells with 2009 Aerial.pef	AEPPRK000197.pdf
North Surge Pond Liner Field Work	North Surge Pond Liner Field Work.pdf	AEPPRK000198.pdf
North Surge Pond SW Labs	North Surge Pond SW labs.pdf	AEPPRK000246.pdf
Pirkey Final 2009 Inspection Report	Pirkey FINAL 2009 Inspection Report.pdf	AEPPRK000266.pdf
Pirkey Groudwater Elevations, Revision 7	Pirkey Groundwater elevations rev7-2010.xls	AEPPRK000312.pdf
Pirkey TCEQ Inspection Memo January 14, 2009	Pirkey TCEQ Inspection Memo Jan 14, 2009.pdf	AEPPRK000313.pdf
Monitor Wells Boring Logs	PRK MW borings 01.pdf	AEPPRK000315.pdf
Monitor Wells Boring Logs	PRK MW borings 02a.pdf	AEPPRK000322.pdf
Monitor Wells Boring Logs	PRK MW borings 02b.pdf	AEPPRK000331.pdf
Monitor Wells Boring Logs	PRK MW borings 03.pdf	AEPPRK000343.pdf
Monitor Wells Boring Logs	PRK MW borings 04.pdf	AEPPRK000347.pdf
Monitor Wells Boring Logs	PRK MW borings 05.pdf	AEPPRK000351.pdf
Monitor Wells Boring Logs	PRK MW borings 06.pdf	AEPPRK000359.pdf
Monitor Wells Boring Logs	PRK MW borings 07.pdf	AEPPRK000364.pdf
PRK MW Data Table with notes	PRK MW Data Table w_notes.xls	AEPPRK000370.pdf
PRK TPDES Water Flow Diagram	PRK TPDES Water Flow Diagram.pdf	AEPPRK000372.pdf
Sargent & Lundy Boring Location Plan	prk_1_aep_c1_f.tif	AEPPRK000373.pdf
Site Development Grading & Drainage Plan – Sheet 3	prk_1_aep_c12-3_m[1].tif	AEPPRK000374.pdf
Site Development Grading & Drainage Plan – Sheet 5	prk_1_aep_c14_l.tif	AEPPRK000375.pdf
Site Development Grading & Drainage Plan – Sheet 6	prk_1_aep_c15-6_k[1].tif	AEPPRK000376.pdf
Bottom Ash Basin Plan – Sheet 1	prk_1_aep_c19-1_l.tif	AEPPRK000377.pdf
Bottom Ash Basin Plan – Sheet 2	prk_1_aep_c20-2_k.tif	AEPPRK000378.pdf
Bottom Ash Basin Plan – Sheet 3	prk_1_aep_c21-3_j1.tif	AEPPRK000379.pdf
Bottom Ash Basin Sections & Details	prk_1_aep_c22_j.tif	AEPPRK000380.pdf
Surge Pond Plan & Sections	prk_1_aep_c28_h Surge Pond.tif	AEPPRK000381.pdf
Grading Sections Sheet 4	prk_1_aep_c34_h[1].tif	AEPPRK000382.pdf
Waste Water Ponds Lining Verification and Monitoring Wells	prk_1_aep_hp56_g.tif	AEPPRK000383.pdf
Bottom Ash Pond Structures	prk_1_aep_hp119_a.tif	AEPPRK000384.pdf
Property Development	prk_1_aep_m2_j.tif	AEPPRK000385.pdf
Plant Water Usage and Waste Water Scheme 1 of 2	prk_1_aep_m69-1_l orig water balance.tif	AEPPRK000386.pdf
Plant Water Usage and Waste Water Scheme 2 of 2	prk_1_aep_m69-2_d orig water balance.tif	AEPPRK000387.pdf
Ash Pond Weir Box Structure Plan, Sections & Details	prk_1_aep_s466_e Bottom Ash Outlet Structure.tif	AEPPRK000388.pdf
Design Summary for Lignite Storage Area and Wastewater Pond Facilities Document 1	S&L WW Pond Original Design Basis 1-31-83 - Doc #1.pdf	AEPPRK000389.pdf
Design Summary for Lignite Storage Area and Wastewater Pond Facilities Document 2	S&L WW Pond Original Design Basis 1-31-83 - Doc #2.pdf	AEPPRK000478.pdf

Cohesive Lining Construction Verification Program for Lignite Storage Area and Wastewater Pond Facilities	Spec 6141 - Liner Verification Design 9-13-83.pdf	AEPPRK000487.pdf
Waste Water Ponds Lining Verification and Monitoring Wells	Wastewater Pond Liner Verification.pdf	AEPPRK000500.pdf
Wastewater Ponds Permit Data Report - Revisions	WW Pond Design Basis 04251984.pdf	AEPPRK000573.pdf
Wastewater Ponds – Liner Verification & Monitoring Wells	WW Pond Liner Boring Summary 09141984.pdf	AEPPRK000591.pdf
Report for New Monitor Well Installation and Closure of Old Well	WW Pond Liner Supplement.pdf	AEPPRK000598.pdf
Unit 1 North Surge Pond, Sheet 1 of 2	hp-91.TIF	AEPPRK000640.pdf
Contract 8789 – T.L James Industrial Constructors, Inc, Construction of Sludge Disposal Area, Phase 1, Section 4	Landfill Expn Ph 1 Sec 4 1993 and New Landfill Pond 1994 Const Spec.pdf	AEPPRK000641.pdf
Alliance, Inc. Construction Field Report	Landfill Pond Const Engr Notes 1993 1994.pdf	AEPPRK000674.pdf
CTL Geotechnical Investigation, Proposed Levee Construction Sludge Disposal	Landfill Pond Dike Borings.pdf	AEPPRK000716.pdf
Alliance, Inc. Detention Basin No. 2 Lignite Runoff Pond	Landfill Pond Dike Key Engr Change 1994.pdf	AEPPRK000728.pdf
Alliance, Inc. Sludge Disposal Area Expansion, Basin No. 2	Landfill Pond Engr Report Exec Summary 11 1994.pdf	AEPPRK000732.pdf
Sargent & Lundy Wastewater Treatment Specification H-4507	S&L HWP Design Wastewater Pond Operation 10 13 1983.pdf	AEPPRK000739.pdf
TCEQ TPDES Permit No. WQ0002496000 / PRD2007TX	TPDES Permit PRK2007TX.pdf	AEPPRK000762.pdf

Documents received following Draft Report submittal:

1. Comments on Draft Dam Assessment Report - Pirkey Plant, by AEP, dated February 23, 2011
2. General Comments on Draft Assessment of Dam Safety, Pirkey Plant, by AEP, dated February 11, 2011
3. Comments on Draft Assessment Report, by EPA, undated
4. Hydrologic & Hydraulic Report North Surge Pond, East & West Bottom Ash Ponds, Secondary Ash Pond and Landfill Pond, by Johnson & Pace Incorporated, dated May 2011 - Document no. AEPPRK0000808

APPENDIX D
Monitoring Well Groundwater Elevation Data
(2005 – 2010)

Pirkey monitoring well groundwater elevations

Well ID	M-1	M-2	M-3	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15
TOC, ft	341.05	305.02	355.26	335.75	342.08	372.79	365.78	365.50	363.67	359.72	358.05	355.35	360.60	364.61	380.99	364.35	363.67	361.60
Date																		
6/3/2005		298.86	329.48	319.63	326.75	342.06	351.98	350.16	349.95	344.70	342.53	340.07	342.04	350.31	360.31	350.19	352.06	350.40
12/20/2005		298.01	326.57	319.18	326.56	338.08	350.86	348.05	347.75	342.76	340.51	338.10	341.71	348.29	355.58	347.94	349.15	346.84
6/27/2006		297.55	326.43	319.26	325.95	339.54	351.28	348.34	348.48	342.66	340.03	338.50	340.90	348.30	356.86	348.13	348.11	346.64
12/13/2006		298.16	326.04	320.19	326.71	339.75	350.50	348.53	348.32	343.43	339.27	338.32	342.00	348.48	358.24	348.40	349.21	347.97
6/21/2007		299.14	335.33	320.14	326.73	341.12	354.07	351.64	350.86	345.78	340.64	340.20	342.81	351.52	363.35	351.40	352.20	351.88
12/19/2007		298.59	326.67	319.30	326.72	340.37	351.91	350.16	349.70	344.84	340.24	339.36	342.63	350.08	359.86	350.04	351.45	350.94
7/2/2008		298.60	328.21	320.10	326.69	342.91	353.85	351.42	351.04	345.61	341.71	339.99	342.92	351.33	363.18	351.28	352.40	352.10
12/5/2008		299.28	327.25	319.99	326.98	340.26	357.03	352.15	350.72	345.74	340.56	338.99	343.56	351.60	367.58	351.02	353.21	352.32
6/10/2009		299.20	328.75	319.99	326.70	343.54	354.39	351.59	351.05	345.35	341.48	339.19	343.18	351.54	363.87	351.48	353.53	352.55
12/8/2009		299.62	331.75	322.91	327.74	343.48	358.52	353.96	352.79	348.66	343.29	341.19	344.32	353.44	371.45	353.20	356.53	354.36
7/7/2010		299.11	329.63	319.64	326.33	340.99	352.01	350.60	350.08	344.30	342.31	339.51	341.82	350.09	359.74	350.45	352.28	349.49